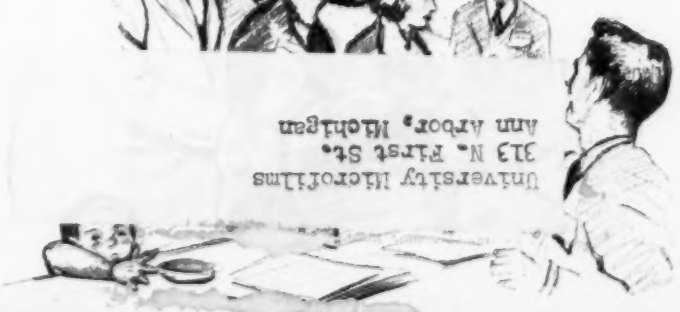
JUNE 1956

plating

JOURNAL OF THE AMERICAN ELECTROPLATERS' SOCIETY



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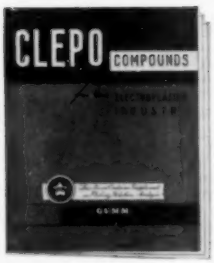

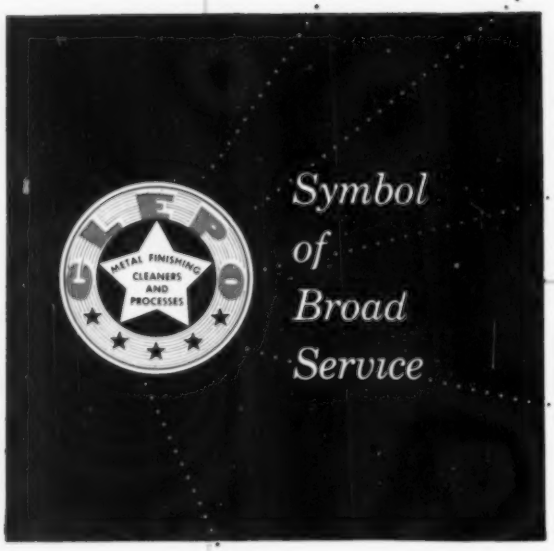

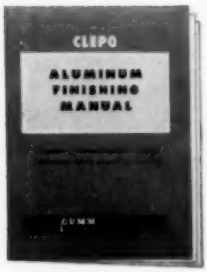

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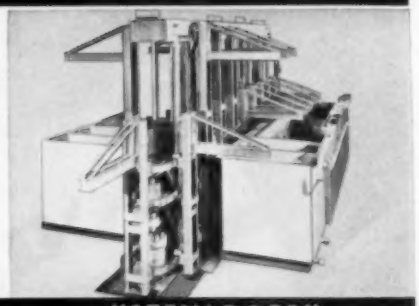

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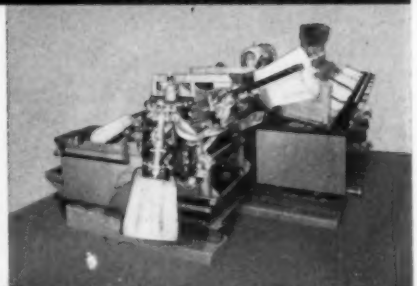

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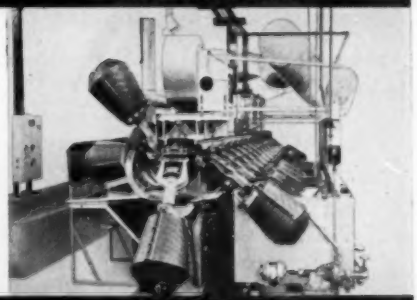

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plating

Journal of the American Electroplaters' Society

June 1956 **Vol. 43, No. 6**

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EDITORIAL

Y'All Come

The American Electroplaters' Society will hold its Annual Convention in Washington, D. C. from June 17 to 21, as guests of the Baltimore-Washington Branch.

We urge you to attend and bring with you the past year's accumulation of worries, questions and problems on the subject of metal finishing. Some forty technical papers have been prepared from which we are sure you will find a solution to the many trials which may have beset you.

For the first time, a special program is being arranged for children in the age group from seven to fourteen. This will include fascinating sight-seeing trips to points of interest in our Nation's Capital which will be made as interesting and educational as possible and, of course, will be supervised by competent adults.

As for the ladies, something special has been arranged for them too.

However, the main purpose is to present the latest technical developments in the finishing of metals. Because of the large number of papers being presented, Educational Chairman Dr. Abner Brenner of the National Bureau of Standards, has arranged dual sessions so that you may hear the papers in which you are most interested. The meeting rooms are accessible to each other in order that you may hear the subjects which concern you.

Visits to interesting technical centers and plating installations have been arranged. One of the most interesting of these places is the Electrodeposition Section of the National Bureau of Standards. This section, formerly supervised by Dr. Blum, now under the direction of Dr. Brenner, has done some of the most valuable research which the Society undertook.

If you are interested in the management of plating rooms, or shops, you will wish to attend the Management Seminar of the National Association of Metal Finishers, which will take place in Washington during the Convention.

Come and bring your family! You will add to your knowledge of metal finishing while the family enriches their knowledge of history and the Nation's Capital.

Clyde Kelly

President

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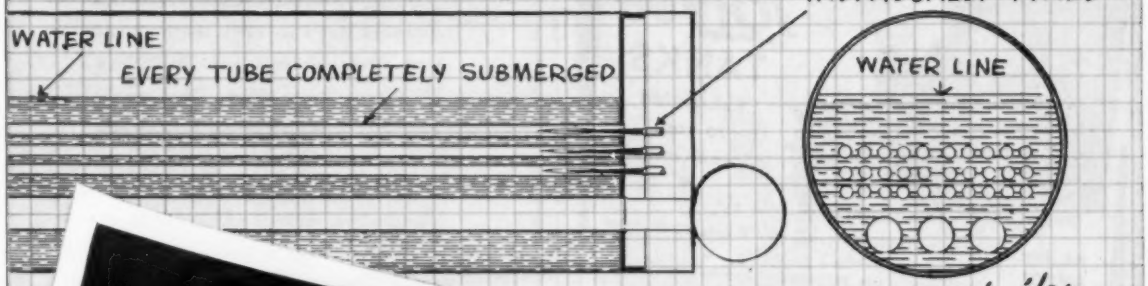
when you buy a steam boiler . . . be sure to look at the picture of a Sellers Immersion Boiler



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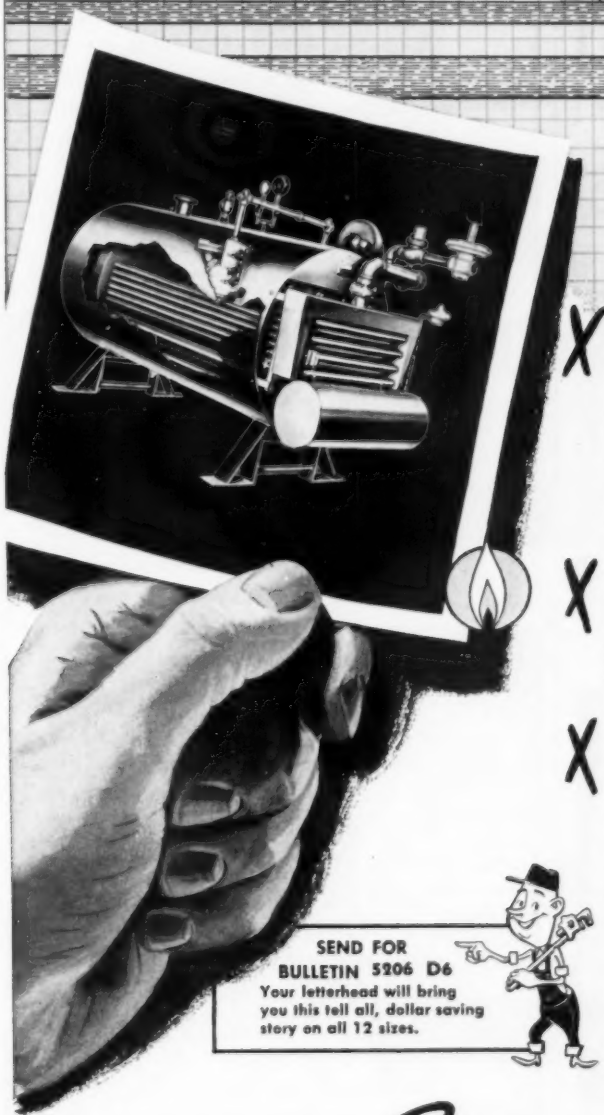

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✗ the average flue gas travel is 15 feet!

Maximum, almost complete utilization of the exhaust heat is assured with a Sellers Immersion Boiler. This is a result of Sellers exclusive design—with the firing tubes completely submerged and *located over the return tubes,* there is a long, slow flue gas travel—an average of 15 feet! Heat can only go into the water.

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12	12″	24″	26.00	40	18″	36″	59.00
9	10″	24″	23.00	50	18″	48″	69.00
7	9″	24″	21.00	27	22″	18″	49.00
10	16″	12″	26.00	30	22″	20″	53.00
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COVER STORY

Despite the oft quoted and obviously true statement that a picture is worth a thousand words, pictures have limitations. Photographs freeze action. They are the manner of something which is happening at a given instant to specific people in specific places. It is a great photographic artist, indeed, who can achieve familiarity and employ broad meaning in a photographic picture.

It was necessary to capture the kaleidoscope of a convention in such a manner as to imply the broad activities involved. And so, a form was needed which would capture the sweeping panorama of people in action and yet carry the form of the coming convention. A brief study of the cover will infer that nothing has been overlooked. Here are the ladies, the children, the education, the technical, the committees and nearly all the activities that can be anticipated.

The form, which yielded the most flexible message, was one familiar to newspaper readers in that it has been used by courtroom reporters. No ordinary artist could possibly capture this human drama.

We asked Donald Voorhees to execute the job. This man is no ordinary illustrator; his water colors have hung in the New Jersey Water Color Society galleries. He is an accomplished artist as well as an energetic workman.

This is the way in which we were able to project the personalities, while at the same time freezing the actions and activities of the convention. We thought that our readers will agree that the fluidity of action has been preserved even as this artist managed to capture the "feel" of the great convention which will take place this month.

THE EDITOR

3 STANDARD SHAPES

"RECTANGULAR"

"TEAR DROP"

"DOG BONE"

NEW!

SHAPED, EXTRUDED APW SILVER ANODES

CONTROLLED GRAIN SIZE: APW EXTRUSION PROCESS* controls grain size within definite limits—minimizes sheddings

ROLLED FLAT PLATE ANODE SECTION: Photomicrograph illustrates highly irregular, uncontrolled grain size—a major cause of shedding and rough electrodeposits.

*Pat. Pending

APW EXTRUDED ANODE SECTION: Note small, fully controlled regularity of grain size to promote uniform corrosion, smoothest electrodeposits and less rejects.

The three standard shapes of APW Extruded Anodes were developed to extend the useful life of anodes—*to lower plating costs!*

Through scientific design, the distribution of mass material helps to maintain a more efficient ratio between anode weight and active surface area. After 85% by weight has been plated off, this APW anode *retains 80% of its original active surface area!* You profit three ways with longer anode life, minimized polarization and less silver scrap to be refined.

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To be certain the silver you buy in anodes is used most efficiently, APW will develop special anode shapes to meet particular plating bath conditions. We'll be glad to assist with your anode problems.

293

THE AMERICAN PLATINUM WORKS

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Quick facts on stop-off materials

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Unichrome Wax-Type Compounds are applied by dipping. They can be melted off the work when the job's done, and reused. Types are available for high as well as moderate temperature baths.

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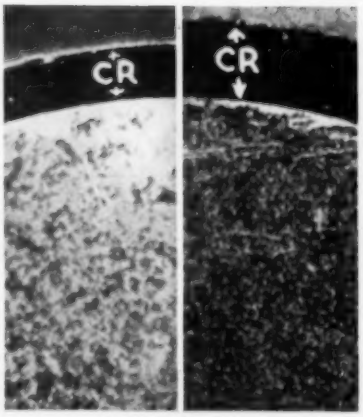
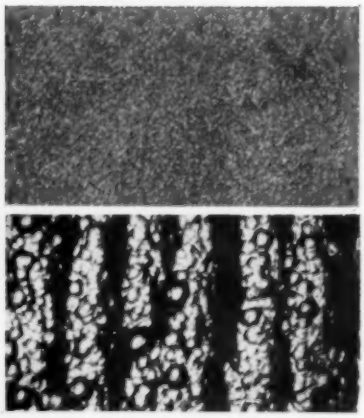


Macrograph of steel rod cross section at left with 0.016" chromium deposited in 16 hours by ordinary solution. Identical rod section at right in SRHS under identical conditions got 40% thicker deposit.



Surface photomicrographs: SRHS Chromium (top) levels over surface irregularities. Ordinary chromium at bottom shows no such action. Both baths operated 7 hours under identical conditions.

Plants save plating and grinding time with Unichrome high speed plating process*

Two features of Unichrome SRHS Chromium prove particularly beneficial in hard chromium plating operations. For years now, they have enabled platers to cut costs substantially.

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BETTER LEVELING ACTION

Deposits from SRHS Baths help level over the usual surface imperfections on the base metal. They also exhibit a smoother surface free from nodules. Grinding time is thereby cut. As a further result, less thickness need be deposited to allow for grinding, permitting still more savings in plating time.

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Self regulation of important constituents makes SRHS Chromium a more fool proof bath, too . . . one which maintains optimum plating balance and avoids control problems. Send for Bulletin which tells more.

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COCKTAILS
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COFFEE AT 10 p.m.

WEDNESDAY, JUNE 20
6:00 p.m. to 10:00 p.m.
COCKTAILS

THURSDAY, JUNE 21
4:00 p.m. to 7:00 p.m.
COCKTAILS
11:00 p.m. to 1:00 a.m.
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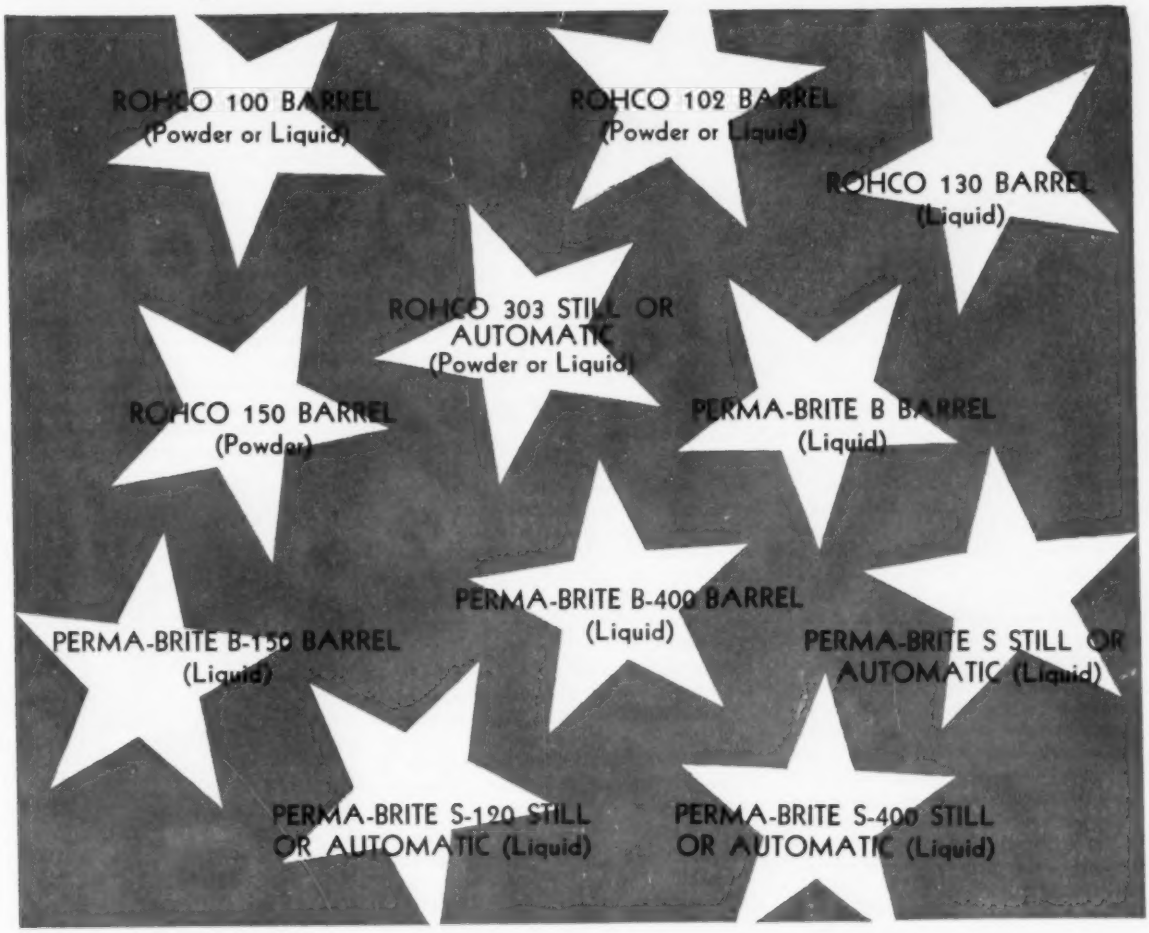

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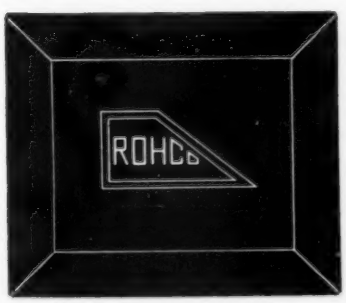

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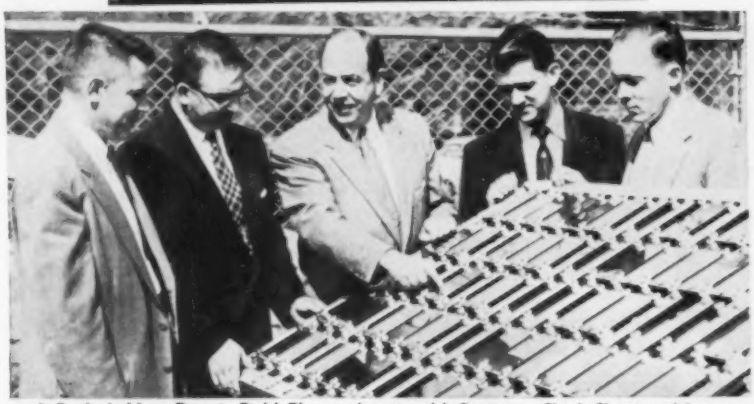
"The Hull Cell Test Makes Plating Best"

INDUSTRY NEWS



L-R: Jack Hart, Detroit Field Electro-chemist; Al Squitero, Chief Chemist; Myron B. Diggin, Technical Director and Vice-President; Warren McMullen, Metallurgist; and Jim Sweet, Eastern Field Electrochemist

Testing A New Plating Process—Metal panels that have been finished in a new bright nickel plating process called Levelume are inspected by company electrochemists at Hanson-Van Winkle-Munning Co., where the new process was recently developed.

After plating, the panels in the accompanying picture are weather-tested on the exposure rack outside H-VW-M's laboratory in Matawan. Such testing may last months or years, while experts study the effect of weather conditions on the different finishes. In this way H-VW-M can determine which plating conditions and solutions will provide the best protection against corrosion and weather conditions.

This is but one of the many tests that were made in developing the new process. Recently announced by H-VW-M, Levelume is reportedly the first bright nickel process to combine qualities of "full" brightness, high leveling and exceptional speed.

Field tested in several high-production installations, Levelume has shown deposition rates 100 per cent higher than the fastest processes available today.

Practically any existing nickel plating process can be converted to Levelume in a matter of a few days, according to H-VW-M. No special auxiliary equipment need be installed, except provisions for air agitation. Tanks only have to be thoroughly cleaned. Almost any rubber-lined tank previously used with bright nickel solution can be employed with the Levelume process.

Newly developed addition agents are of key importance in the new process. With these addition agents, it is possible to use an activated carbon pack in the filter for the plating solution. This continuously removes harmful organic contaminants. Consequently, costly and time-consuming periodic batch purification is not required.

Extensive tests, including those illustrated, have indicated that Levelume has: good ductility and controlled stress in either the compressive or tensile side; effectiveness within a wide current density range—from 20 to 150 asf; high leveling, scratch-filling characteristics; deposits with high surface activity; uniform brightness in recessed areas.

H-VW-M also reports these extras: bath stable in operation, pleasing white color deposits, simplified control, high tolerance to impurities and low operating costs. With the bath agitated and continuously filtered, roughness of deposits is not encountered.

Spanish Rep Named—Instituto Elecyroquimico, S. A. of Barcelona has been appointed Spanish representative of The Roto-Finish Company of Kalamazoo, Mich., to handle its Roto-Finish machines and equipment.

Roto-Finish manufactures a complete line of machines, chips, and compounds for barrel finishing operations including mechanical grinding, deburring, descaling, polishing, britehoning, and coloring of forged, stamped, cast, and machined parts.

Larger Quarters—Dixon & Rippel, Inc. of Kingston, N. Y., manufacturers of fine wire scratch brushes for silversmiths and platers announce that to celebrate their one hundredth year in business they are moving into their new plant in Saugerties, N. Y. on or about July 1, 1956.

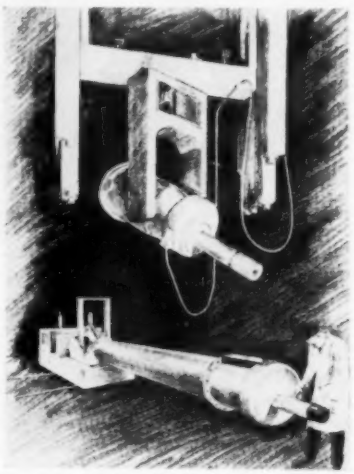
The new factory will double the present manufacturing space and greatly facilitate their increased production made necessary by expanding sales of their brushes.

It is requested that all inquiries be directed to Box 116, Saugerties, N. Y. after July 1, 1956.

Big X-ray—Plans for one of the most powerful and versatile X-ray installations in the metals industry have been disclosed by Chicago Bridge and Iron Company, builders of pressure vessels and heavy duty weldments for industry and the nuclear energy field.

The proposed facility will house two complementary Van de Graaff supervoltage X-ray generators—one and two million volts respectively—both manufactured by High Voltage Engineering Corp., Cambridge, Mass. The powerful machines will be used jointly in inspection of storage and pressure vessels and investigations of nuclear reactor chambers.

The Van de Graaff generator has proven exceptionally well-suited for radiographic studies of a wide range of metal products—relatively thin fabrications of special alloys, as well as heavy steel castings and weldments. The two-million-volt unit provides a means for rapid and accurate inspection of steel thicknesses up to 10 inches, with less than one-minute exposure required for thicknesses under 5 inches.



This machine records, with better-than-average sensitivity, discontinuities thinner than ½ per cent of total thickness—far more sensitivity than that required by ASME welding codes. A thickness range of slightly more than 2 inches of steel can be recorded on a single film with a single exposure.

The sealed off X-ray tube in the Van de Graaff features a titanium absorber system which preserves the necessary internal vacuum without sacrificing low-cost construction techniques.

Export Managers Appointed—The Atlas Mineral Products Co. of Mertztown, Pa., is pleased to announce the appointment of Ballagh & Thrall, Inc., 1010 Schaff Bldg., Philadelphia 2, Pa.

Ballagh & Thrall will manage the sale of all Atlas products for export to all countries except Mexico and the United Kingdom.

INDUSTRY NEWS BRIEFS

● Fourteen different fire training courses, each lasting three days, will be conducted during 1956 on the 10-acre fire test field of **Ansul Chemical Company,** at Marinette, Wis.

● The Fourth Annual Industrial Landscaping Awards have been announced by the **American Association of Nurserymen.** The awards are valued by industrial companies in improving their community and employee relations. The competition for this year ends September 1, 1956.

● Scheduled to go into production this Spring is the new vinyl chloride monomer plant being constructed by **Solvay Process Division, Allied Chemical & Dye Corporation,** at Moundsville, W. Va.

● The coveted "Oscar" of the Academy of Motion Picture Arts and Sciences was awarded to **National Carbon Company, a Division of Union Carbide and Carbon Corporation,** for its contribution to the art of studio lighting. The bronze statuette—the only one presented this year for scientific and technical achievement—was in recognition of National Carbon's development and production of the highly efficient, yellow flame carbon for motion picture color photography.

● **Kaiser Aluminum & Chemical Corporation** has announced organization of a new division, the **Foil Kraft Division,** to handle the manufacture and national sales of aluminum food containers.

● The domestic tungsten mining industry is on record as opposing legislation authorizing the United States to join the Organization for Trade Cooperation.

● **The National Automatic Tool Company, Inc.,** one of the nation's leading machine tool builders, has announced a new installment plan that will allow 10-year terms with payments geared to new depreciation schedules.

● A contract for the development of miniaturized electronic components that can withstand high temperatures has been awarded to **Horizons Incorporated,** the Cleveland industrial and governmental materials research organization by the **Wright Air Development Center.**

● **J. W. Rex Company,** metal heat treating and chemical finishing specialists, has become the first licensed processor of architectural "Alodized" aluminum, the Lansdale, Pa., company announced. Alodizing now supplements the conventional anodizing offered by the company's Chem-Fin Division since 1948.

● Nineteen industrial companies have joined in a cooperative venture to determine how nuclear research can be of value in their operations. The companies are participators in the nuclear reactor research program at **Armour Research Foundation of Illinois Institute of Technology** in Chicago.

● Construction began in February on the fourth expansion in less than three years for **Minnesota Rubber and Gasket Co.,** Minneapolis. Estimated cost of this project is $500,000.

Brass Plating Made Easy

●

There is always a standard American tendency to depreciate any claim made by a vendor by a considerable amount. It is so easy to put down on paper half truths.

●

Brass plating is not a simple operation. Conditions must be right. Any chemist confronted with the problem of control would without prior knowledge consider the control of a brass plating solution very difficult. We will agree that it is difficult by ordinary analytical methods. That is the whole purpose back of True Brite Brass Maintenance Solution. With a simple balanced solution of the necessary ingredients that go into a brass solution you can maintain these solutions with good color and efficiency. Only a single addition is normally required with occasional corrections to bring back to original formula. It is not necessary to make daily checks of the solution. Additions can be made by ordinary unskilled personnel.

●

We wish we could promise complete control without any supervision but the skill of the plater is still useful in determining when corrections are necessary. To assist we have a bulletin on brass plating and some new sheets on analysis and solution formula that are very useful. These are available on request.

●

Yellow brass is the simplest to control. The yellow color does not change too rapidly with change in composition. Red or bronzy brass solutions are more difficult. To control properly the copper content of the plate must be maintained within about 1%. True Brite has special Brass Maintenance Solutions designed to help you with the problem of maintaining these solutions. We can recommend formulas and have available concentrated solutions which will enable you to make up new solutions simply and with a minimum of trouble.

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As prime manufacturers of copper and other cyanides the price of the materials is competitive. We have statements from users advising us of their costs which compare with the use of basic chemicals. Most of all comparisons with so-called proprietary solutions show that brass plating solutions operated according to our suggestions are as fast and as bright with less difficulty with color both in barrels and still tanks. Your inquiry is invited.

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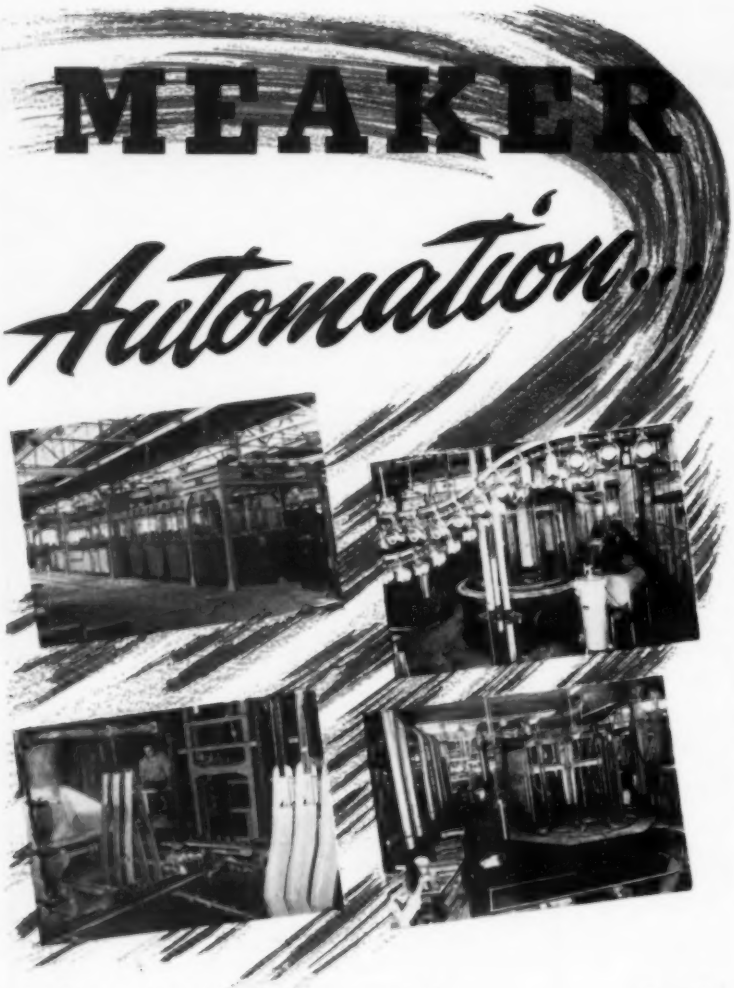

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INDUSTRY NEWS

Honor First Employee—The Channel Master Corporation, world's largest manufacturer of TV antennas—a young industry—honored "veteran employees" at a service awards dinner in Ellenville, N. Y.

Channel Master presented a special award to its first employee, Wayne Morris, now a production supervisor. He joined the company 8 years ago when it was first formed.

Harry Resnick, president of Channel Master, commented that it was little short of amazing that 120 persons at the dinner had a record of 5 or more years of service with the company, since 5 years ago the company employed only 150 workers. Channel Master today employs over 1,000 people in a modern 225,000 square foot industrial plant.

Scholarships—To help encourage increased interest in engineering careers, New Holland Machine Company of New Holland, Pa., will grant three scholarships in Agricultural Engineering at Pennsylvania State University.

Two of the scholarships will be granted to high school seniors in Lancaster County where New Holland has two plants, and the other scholarship will be in Mifflin County where New Holland has a plant at Belleville.

Veteran Reps Attend Conference—Seventeen Oakite technical service representatives from as far west as Portland, Ore. met in New York City for a five-day Anniversary Conference. The program was the first of three planned this year to enable field men to pool their experience, work side by side with laboratory chemists, and become thoroughly familiar with new products being made available to industry.

The Oakite service experience of the men, called in on their major anniversaries with the company, averages 12 years. Top man of the group was C. A. Peterson, of Los Angeles, with 35 years as an Oakite representative.

During the conference the men discussed new developments in barrel finishing and treatment of aluminum, new advances in food sanitation; new materials made necessary by technological advances in the paper, rubber, glass, chemical, petroleum, and railroad industries; applications of the growing line of Oakite CrysCoat phosphating materials; and new developments in water conditioning.

Similar conferences are planned for June and September, in which other representatives selected from the company's 218-man field organization will take part. The conferences are planned so that periodically each field representative will participate in intensive refresher training, designed to make his services even more valuable to the industries he serves.

(Advertisement)

SPECIAL REPORTS ON FINISHING NON-FERROUS METALS

NUMBER I—Decorative, Corrosion-Resistant Finishing with Iridite

Chromate conversion coatings are well known and accepted throughout industry as an economical means of providing corrosion protection, a decorative finish or a good paint base for non-ferrous metals. However, continued developments are so rapid and widespread that many manufacturers may not be completely aware of the breadth of application of this type of finish. Hence, this digest of current information; to bring you up to date on the many ways in which you can combine salable appearance with durability in one finish at a competitive price advantage. Report II on paint base, corrosion-resistant finishes and Report III on chemically polished, corrosion-resistant finishes are available on request.

First, as a basis for this discussion, a "decorative" finish is considered as any chromate film that is used as a final finish in itself. It may be truly decorative in that its sole purpose is to enhance the beauty of the product. For example, a bright chrome-like finish or a pleasing bronze appearance are among the many effects that can be obtained. It may be functionally decorative in that it reduces reflectivity for camouflage purposes or provides a means of color-coding parts. But, in all cases, the Iridite films protect the metal against corrosive attack.

Iridite finishes are now available for all commercial forms of the more commonly used non-ferrous metals, including zinc, cadmium, aluminum, magnesium, silver, copper, brass and bronze. These films can produce a wide variety of pleasing appearances. The basic colors of the Iridite coatings are grouped below by metals.

ZINC and CADMIUM: Metallic bright, light iridescent, iridescent yellow, bronze, olive drab.

COPPER, BRASS, BRONZE: Metallic bright, yellow.

ALUMINUM ALLOYS: Clear, iridescent yellow, brown.

MAGNESIUM ALLOYS: Metallic bright, iridescent yellow-red, brown.

SILVER: Metallic bright.

In addition, many films can be modified by bleaching or by dyeing. Among the dye colors available are various shades of red, yellow, green, blue or black.

Depending upon the metal and the Iridite used, corrosion resistance of clear and bright films ranges from mild passivity to as high as 500 hours in salt-spray; on heavier dark films, salt-spray resistance ranges from approximately 100 to 1000 hours.

It is this combination of decorative and corrosion resistant properties that accounts for the widening use of Iridite finishes. For example, Iridites #4-73 and #4-75 (Cast-Zinc-Brite) make possible for the first time, a combination of lustrous chemical polishing of the as-cast surface of zinc die castings and good resistance to corrosion. Further, in many cases, sizeable savings in the cost of buffing and electroplating are realized.

WHAT IS IRIDITE®?

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002" max.) gel-like, complex chromate film of a non-porous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

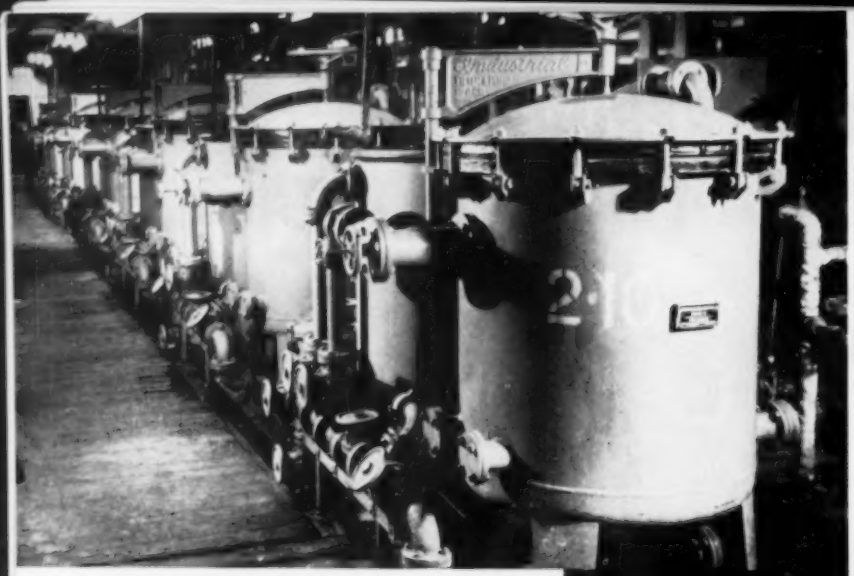
On many steel parts, a simple system of zinc or cadmium plate and bright Iridite is used instead of more costly electroplated finishes to provide a bright, decorative and protective finish with tremendous savings in material, equipment and labor.

In finishing aluminum, where corrosion resistance or paint adherence is the prime consideration, the aircraft industry has all but abandoned the anodizing process in favor of recently developed chromate conversion coatings, among them Iridite #14 and #14-2 (Al-Coat). These formulations and their method of application can be varied to retain the original metallic appearance while providing acceptable corrosion resistance, or to produce a fully colored brown finish that offers exceptional corrosion protection. Again, time and manpower savings are astounding—one company saved at least $15,000 a year on maintenance of racks alone and another $40,000 on materials and labor in only nine months. In addition, of course, hundreds of thousands of dollars are saved by eliminating the need for expenditures for generators, heating equipment and racks.

Iridites are widely approved under both Armed Services and industrial specifications because of performance, low cost and savings of materials and equipment.

In planning or designing, you should consider the many other characteristics of Iridite finishes which may enter into the specific problem. In addition to having decorative and protective functions, these chromate coatings form an excellent base for organic finishes and bonding compounds. They have low electrical resistance. Some can be soldered and welded. The Iridite film itself does not affect the dimensional stability of close tolerance parts.

You can see then, that with the many factors to be considered, selection of the Iridite best suited to your product requires the services of a specialist. That's why Allied maintains a staff of competent Field Engineers—to help you select the Iridite to make your installation most efficient in improving the quality of your product. You'll find your Allied Field Engineer listed under "Plating Supplies" in your classified telephone book. Or, write direct and tell us your problem. Complete literature and data, as well as sample part processing, is available. Allied Research Products, Inc., 4004-06 E. Monument Street, Baltimore 5, Maryland.



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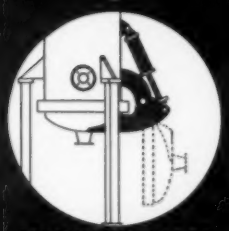
Easily adapted for special uses . . . these Vertical Filters typify Industrial engineering . . . purposely designed to be built for your exact needs.
Several of the many possible modifications are shown at the right . . . for recovery of large volumes of solids the bottom opening filter is ideal; for smaller volumes, the clean out door is more practical and less costly. Another example of specialization is the jacketed shell filter, for use where small temperature variations are important. Other optional features are quick-opening covers, individual leaf outlets and self-cleaning devices that offer sluicing, shaking or air wash cleaning.

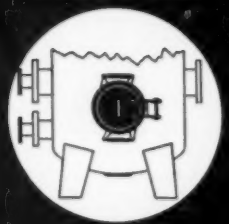
Lower filtration cost . . . proven performance, minimum down time, the use of low cost but efficient filter media plus a design exactly suited to your needs, all contribute to Industrial's low over-all cost per gallon of filtrate.

Write now for details on flow systems, special equipment, filter and leaf construction. Ask for 8 page Bulletin 111. →

MODIFICATIONS



RECOVERING LARGE VOLUMES OF SOLIDS



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INDUSTRY NEWS

Glenn Company Acquired—As another step in its current expansion program, Metal & Thermit Corp. has acquired the Glenn Company, Oakland, Calif., makers of constant voltage power sources, welding wire feeding devices and other products. The business is being moved to new quarters at 703 37th Avenue, Oakland, where it will be operated as a manufacturing subsidiary under the name M & T Welding Products Corp.

In announcing the move H. E. Martin, president of Metal & Thermit, said it is expected that applications for the constant voltage power source will be developed in the electroplating, metallurgical and electronics industries—fields in which Metal & Thermit is already active—as well as in welding.

Officers of the newly formed M & T Welding Products Corp. are: H. E. Martin, president; G. G. Glenn, E. E. Anderson and J. L. Oberg, vice-presidents; J. F. Condon, secretary and C. J. Beasley, treasurer.

Multi-Million-Dollar Expansion—A multi-million dollar expansion program in the atomic power field has been announced by Sylvania Electric Products Inc.

Don G. Mitchell, Sylvania chairman and president, said that the first step of the program, which will extend over the next five years, will be new production and development facilities for nuclear fuels and components. The new production plant and laboratory will be constructed on one of several sites under consideration in the East, Mitchell said. He declined to be more specific as to possible location. W. Benton Harrison, vice-president—finance, said that the expansion would be accomplished entirely with company funds.

New Central Territory Office and Plant—The American Chemical Paint Company announces that it has acquired office and plant facilities at St. Joseph, Mo. and expects to be operating there about June.

The new centrally located ACP office and plant will serve a territory lying between the Mississippi River and the Rockies and from Canada to the Gulf of Mexico. Present plans include the production of metalworking chemicals (rust proofing and paintbonding phosphate coatings, phosphate coatings to facilitate cold forming operations, pickling acid inhibitors, oil well acidizing and corrosion inhibitors) and agricultural chemicals.

Heading up the St. Joseph ACP branch will be J. H. Abrams, associated with the American Chemical Paint Company for many years in a supervisory capacity in its Pittsburgh territory. In addition, technical representatives will provide technical servicing and consultation for ACP customers in the new Central US territory.

(Advertisement)

Special Reports On Finishing Non-Ferrous Metals

NUMBER II—Paint Base, Corrosion-Resistant Finishing with Iridite

WHAT IS IRIDITE®?

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002" max.) gel-like, complex chromate film of a non-porous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

Chromate conversion coatings are well known and accepted throughout industry as an economical means of providing corrosion protection, a good paint base and decorative finishes for non-ferrous metals. However, continued developments have been so rapid and widespread that many manufacturers may not be completely aware of the breadth of application of this type of finish. Hence, this digest of current information; to bring you up to date on the many ways in which you can obtain proper surface preparation for painting and increase product durability with a single multi-purpose chemical pretreatment. Report I on decorative, corrosion-resistant finishes and Report III on chemically polished, corrosion-resistant finishes are available on request.

First, it is an accepted fact that metal surfaces should be prepared before painting to make possible an efficient paint system. Naturally, this preparation should provide for good initial paint adhesion. Chemical treatments have proved extremely effective in this respect, particularly those of a neutral or preferably acid nature. Further, to be most efficient, chemical treatments should provide a non-porous barrier to maintain adhesion by sealing the metal from the paint and moisture. They should also provide a self-healing film which prevents lateral corrosion in the event that bare metal is exposed through scratching.

The Iridite chromate conversion coatings meet all these requirements. Iridite is a chemical conversion treatment for surface preparation. It provides initial paint bonding by molecular adhesion. It is acid in nature and produces a film that is gel-like and non-porous in structure. Thus, the Iridite film effectively seals the metal from the paint and from moisture penetration. Because the film contains certain relatively soluble constituents, it will protect areas scratched through to bare metal and prevent lateral corrosion. This is accomplished by a gradual leaching of these constituents into the damaged area.

Further, because of its gel-like, non-crystalline nature, the Iridite film will not affect the appearance or texture of the paint film, nor will it dust or powder to mar the painted surface. Because the film is non-porous, paint coverage is increased, thus substantial savings in paint costs will be realized. In addition, treated parts may be stored for long periods of time prior to painting without the risk of entrapped moisture causing blistering when painting.

Iridite chromate conversion coatings are widely used with equal ease and success under both baked and air-dried paint systems. While the actual adherence properties of the Iridite film do not increase appreciably with its thickness, corrosion protection does. The protection of the Iridite film is proportionate to its thickness and should be taken into consideration when selecting the Iridite to meet your needs. However, it is sometimes necessary to sacrifice maximum corrosion protection for appearance when a finished part is to be only partially painted. For example, it may be desirable to use a thin, clear, bright Iridite film if the unpainted areas must present a chrome-like appearance. A typical case is that of instrument housings on which the exterior is painted and the inside left unpainted.

On the other hand, if all surfaces of the product are to be painted and maximum corrosion protection is required, the heavier and most protective Iridite films should be used. For example, all surfaces of zinc die cast fruit juicers are finished with a highly protective Iridite film prior to painting to provide maximum resistance to the corrosive action of fruit juices.

Iridite finishes are now available for all commercial forms of the more commonly used non-ferrous metals, including zinc, cadmium, aluminum, magnesium, silver, copper, brass and bronze. In addition to providing an excellent base for paint, the Iridite films also have high decorative value when used as final finishes in themselves.

These films can produce a wide variety of pleasing appearances including clear bright, iridescent yellow, bronze, olive drab and brown. In addition, many films can be modified by bleaching or by dyeing. Among the dye colors available are various shades of red, yellow, green, blue or black.

In planning or designing, you should consider the many other characteristics of Iridite finishes which may enter into the specific problem. In addition to their functions as protective and decorative finishes, and as bases for organic finishes and bonding compounds, Iridites have low electrical resistance. Some can be soldered and welded. The film does not affect the dimensional stability of close tolerance parts.

Iridites are widely approved under both Armed Services and industrial specifications because of performance, low cost and savings of materials and equipment.

You can see then, that with the many factors to be considered, selection of the Iridite best suited to your product requires the services of a specialist. That's why Allied maintains a staff of competent Field Engineers—to help you select the Iridite to make your installation most efficient in improving the quality of your product. You'll find your Allied Field Engineer listed under "Plating Supplies" in your classified telephone book. Or, write direct and tell us your problem. Complete literature and data, as well as sample part processing, is available. Allied Research Products, Inc., 4004-06 East Monument Street, Baltimore 5, Maryland.

ULTRASONIC CLEANING BY THE SQUARE FOOT

Recent improvements in ultrasonic power-generating equipment, and the perfection of hermetically-sealed transducers operating at 40 kc/sec, have now made it economically feasible to apply ultrasonic cleaning to areas measured by the square foot. Up to now, cost and technical problems have largely confined the benefits of this fast and efficient technique to relatively small units.

The large, uniform radiating surface of the transducers makes them particularly suitable for the removal of buffing compounds, radioactive contamination, soldering flux, plaster, carbon smut, etc. The transducers can also be used for other processes such as quenching, plating, pickling, descaling and dyeing. The cleaning action penetrates deeply into blind holes and other areas difficult or impossible to clean by conventional methods.

The Branson LF-15 Transducers have a radiating surface 2⅝"x6", with thick barium-titanate driving elements that transmit the energy through the top of the stainless-steel housing directly into the cleaning solvent. The modular design of the transducers facilitates a wide choice of flush and focused arrangements of banked transducers.

Generator-Transducers combinations are available with radiating areas from 0.25 to 10 square feet:

Sonogen® Model	Transducer Radiating Area Square Ft.
AP-25	0.25
APT-100	1.00
APT-400	4.00
P-1000	10.00

Cost of complete equipment, per square inch of radiating surface, ranges from $23 down to $14. We will be happy to send you complete information on request.

BRANSON ULTRASONIC CORPORATION
22 Brown House Road, Stamford, Connecticut

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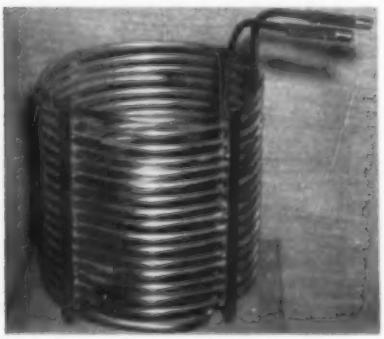

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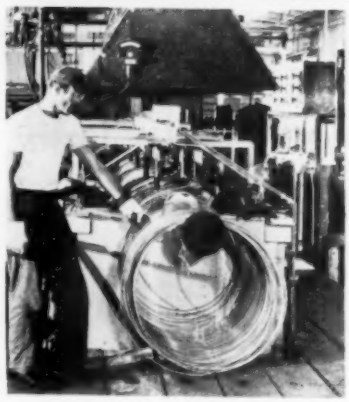
Storts make coils to order in carbon steel, stainless steel, copper, brass, bronze and lead. In Stortswelded coils fine weldmanship is carried out at the joints to keep them full strength, and to leave the full section of the opening inside so that there is nothing to interfere with the free flow of heating and cooling liquid. Precision built, they are stronger, tighter, longer-lasting.

42 STONE STREET — STORTS WELDING COMPANY INCORPORATED — MERIDEN, CONN.

Manufacturers of Welded Fabrications to Specification

INDUSTRY NEWS



Expanded, Centralized Nickel Plating Facilities—A fifty per cent expansion of facilities for commercial production of Fernicklon nickel coated steel wire and consolidation of operations into the National-Standard Division has been announced by National-Standard Company.

According to the announcement by W. H. Parkin, chairman, plating equipment at the company's Jersey City, N. J., plant has been transferred to Niles and new facilities added to increase plating capacity to 34,000 amperes of connected direct current.

Fernicklon, National-Standard's registered trade name for the nickel-coated material, is produced by the improved Kenmore process. Rights to the patented process were acquired in 1955. Electrodeposition of other metals, such as copper and brass, has also proved successful.

Base metal is high carbon, low carbon or alloy steels. Copper alloys have also been used successfully. A uniform coat is electrodeposited directly on rod or wire, and the material then drawn by conventional methods to finished size.

The nickel-coated steel wire, shown in the picture at the take-off end of the plater, is supplied in commercial sizes ranging from 0.010-inch to 0.310-inch, depending upon tensility. Extreme flexibility of the process makes possible coatings of up to 10 per cent nickel, within exceedingly narrow tolerances, even in thin coatings.

Applications for Fernicklon wire encompass a variety of electrical and electronic parts and other components where combinations of strength, corrosion resistance and lustrous finish are desirable.

New Distributor—Antara Chemicals, a sales division of General Aniline & Film Corporation has appointed the Denver Fire Clay Company of Denver as the distributor for its products in Colorado, Wyoming, Montana, Utah, Idaho, New Mexico and Western Texas effective April 1, 1956.

(Advertisement)

SPECIAL REPORTS ON FINISHING NON-FERROUS METALS

NUMBER III—Lustrous, Corrosion-Resistant Finishing with Chemical Polishing Iridite

WHAT IS IRIDITE®?

Briefly, Iridite is the tradename for a specialized line of chromate conversion finishes. They are generally applied by dip, some by brush or spray, at or near room temperature, with automatic equipment or manual finishing facilities. During application, a chemical reaction occurs that produces a thin (.00002" max.) gel-like, complex chromate film of a non-porous nature on the surface of the metal. This film is an integral part of the metal itself, thus cannot flake, chip or peel. No special equipment, exhaust systems or specially trained personnel are required.

Chromate conversion coatings are widely accepted throughout industry as an economical means of providing corrosion protection, a good base for paint and decorative finishes for non-ferrous metals. Certain of these coatings also possess chemical polishing abilities that have luster-producing, as well as corrosion-inhibiting, effects on zinc and cadmium plate, zinc die castings and copper alloys. However, continued developments in this field have been so rapid that many manufacturers may not be completely aware of the breadth of application of this type of finish. Hence, this discussion of the many ways in which this chemical polishing characteristic can be used in final finishing or pre-plating treatments to produce a lustrous appearance with distinct display and sales appeal and appreciable savings in cost. Report I on decorative, corrosion-resistant finishes and Report II on paint base corrosion-resistant finishes are available on request.

The degree of luster possible on a surface is a function of the degree to which the surface can be smoothed. Leveling to provide a smooth surface can be achieved by mechanical or chemical means, or a combination of these, depending upon the luster desired and the original condition of the metal. Chemical polishing effectively imparts luster otherwise difficult and costly to obtain. For this reason, it is often used to supplement or entirely replace mechanical polishing, depending upon the application and the original condition of the metal. Chemical polishing has the additional advantage of providing overall treatment of the submerged part. It reaches into even the deepest corners and recesses that are otherwise inaccessible. Certain of the Iridites are specifically designed to perform this chemical polishing operation. Also, they provide corrosion protection as do all Iridites, thus may be used as a final finish or a pre-plating polish.

If Iridite is to be used as a final finish, in contrast to pre-plating treatment, the chromate conversion coating generated is allowed to remain, providing good corrosion resistance. Color inherent in these Iridite films ranges from a yellow cast to yellow iridescent. These coatings may be used without further treatment where this color is acceptable and good corrosion resistance is desired. Further, these basic coatings can be tinted by dyeing. Among the dye tints available are shades of red, yellow, blue and green. If desirable, the basic coatings can also be modified by a bleach dip leaving a clear bright or blue iridescent finish. In all cases bleaching reduces corrosion resistance.

As examples of this type of final finishing, Iridites #4-73 and #4-75 (Cast-Zinc-Brite) make possible for the first time, lustrous chemical polishing of the as-cast surface of zinc die castings. Thus, in many cases, sizeable savings in finishing cost are realized by elimination of plating costs. This economical method can be used on tools, appliance parts, toy pistols, locks and many other small castings. Another example is the treatment of copper and brass parts, such as welding tips, to eliminate buffing and provide additional corrosion resistance. In many cases, handling costs are reduced appreciably by replacing piece-part handling with bulk processing. Still another example of the use of this chemical polishing and protective quality of Iridite is a simple system of zinc plate, Iridite and clear lacquer instead of more costly electroplated finishes. Typical of this type of lustrous finish are builders hardware and wire goods.

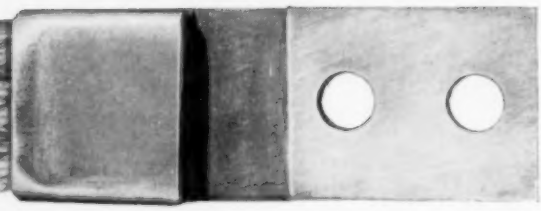
As a pre-plating treatment, in contrast to final finishes, Iridite can be used to chemically polish zinc die castings or copper prior to plating. In such cases, Iridite should be applied as an in-process step, so that the protective film is removed before the plating cycle. The savings in handling, material and labor costs are obvious. This process has made it practical to plate chrome directly over copper on steel, conserving nickel, yet producing a lustrous chrome finish. Used after stripping faulty plate in reprocessing zinc die castings, Iridite restores luster to the casting, thus making possible replating without blistering.

Other Iridite finishes are available to produce maximum corrosion resistance, a wide variety of decorative finishes and excellent bases for paint on all commercial forms of the more commonly used non-ferrous metals. As a final finish, appearance ranges from clear bright to olive drab and brown and many films can be bleached or dyed. As a paint base Iridite provides excellent initial and retentive paint adhesion and a self-healing property which protects bare metal if exposed by scratching. Iridites have low electrical resistance. Some can be soldered and welded. The Iridite film itself does not affect the dimensional stability of close tolerance parts.

Iridites are widely approved under both Armed Services and industrial specifications because of their top performance, low cost and savings of materials and equipment.

You can see then, that with the many factors to be considered, selection of the Iridite best suited to your product demands the services of a specialist. That's why Allied maintains a staff of competent Field Engineers—to help you select the Iridite to make your installation most efficient in improving the quality of your product. You'll find your Allied Field Engineer listed under "Plating Supplies" in your classified telephone book. Or, write direct and tell us your problem. Complete literature and data, as well as sample part processing, is available. Allied Research Products, Inc., 4004-06 East Monument Street, Baltimore 5, Maryland.

Westinghouse Germanium Semitron



rated at 250 amperes . . .
no derating for
parallel operation

The Westinghouse germanium Semitron* rectifying cell, rated at 250 amperes, is ideally suited to electroplating, electrochemical, anodizing and other low-voltage applications.

No derating is required for parallel operation. All production units have a *matched* characteristic of forward voltage drop at the maximum operating peak current.

The cell is water cooled. At recommended rate of flow of one gallon per minute, the maximum temperature rise of the water through one cell is ¾° C.

Hermetic seal protects against atmospheric contamination.

Three voltage ratings are available now in production quantities . . . 26 volts rms, a-c; 45 volts rms, a-c; and 66 volts rms, a-c. Use coupon for more information.

Important electrical data on production units . . .

WA-4052-C

250 amperes	*. . . Maximum average d-c per cell*
66 volts a-c	*. . . Maximum rms a-c from no load to full load*
.7 volts	*. . . Peak forward voltage drop at 250 amperes d-c*
6500 amperes	*. . . Peak surge current for 1 cycle*
4000 amperes	*. . . Peak surge current for 6 cycles*
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J-09003

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At an Allied Products' Detroit plant, Wyandotte's manager of industrial sales, Ed Kubis (left), and Plant Engineer John Rhodes discuss effectiveness of Wyandotte BN as a metal cleaner and Wyandotte R-2 as a rust preventer.

Allied Products cleans 8000 lbs. of forgings an hour with Wyandotte BN!

Serving the construction industry and 75% of the automotive industry with cold-forged bolts and fasteners, Allied Products Corporation, Detroit, Michigan, has been a Wyandotte customer for nearly 15 years.

Allied Products is sold on Wyandotte metal cleaners — using BN for tumble-washing parts before heat treating, and R-2 in the water rinse for in-plant rust protection. This is done in a combination belt-and-drum type washing machine, which cleans and rustproofs both the tote pans and cold forgings. Here, 8000 lbs. of parts are cleaned every hour — 24 hours a day. Always pleased with Wyandotte service, Allied Products likes the way versatile Wyandotte BN does an efficient, round-the-clock cleaning job, prevents rejects.

A free-rinsing industrial detergent — with high soil tolerance, and controlled uniform quality—Wyandotte BN has a silicate-synthetic detergent base formulation for long life, maximum detergency.

For information about BN or any Wyandotte metal-cleaning products, contact our nearest representative. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Also Los Nietos, California. Offices in principal cities.*

Wyandotte
CHEMICALS
J. B. FORD DIVISION
SPECIALISTS IN METAL-CLEANING PRODUCTS

INDUSTRY NEWS

AEC Awards Contract for Ultrasonic System—A contract for the construction and installation of an unusually large ultrasonic cleaning and degreasing system for an Atomic Energy Commission facility has been awarded to Acoustica Associates, Inc., Glenwood Landing, N. Y.

High-frequency generators totaling 20 kilowatts will supply power for energizing hundreds of above-audible sound generating transducers needed to irradiate materials being processed en masse. The ultrasonic energy developed by these transducers according to Acoustica's engineers, will create explosive forces in the cleaning solution as a result of the collapse and formation of millions of entrapped vapor bubbles at the rate of many thousand times per second. These forces eliminate the surface tension binding soils and contaminants to various parts of the material being processed. The scrubbing action of the ultrasonically agitated solution flushes impurities from the entire surface of the material being treated.

It is expected that the introduction of ultrasonic techniques in industry will be tremendously accelerated as a result of AEC recognition. This could catapult the infant ultrasonic industry into a major position in the American economic scene. Gross sales are approaching the $200,000,000 a year mark. The forecast is for a $2,000,000,000 a year market for ultrasonic equipment in the near future.

Only a few years ago, ultrasonics was considered a laboratory curiosity. Within the last year, reports Robert L. Rod, Acoustica's president, the development of low-cost, high-frequency generators of sufficient power to satisfy the heavy production requirements of industry and new techniques of transducer manufacture has enabled the ultrasonic industry to make great headway.

New Brass Mill—Production of copper and copper alloys in the last quarter of '56 by American Brass Company's $15,000,000 brass mill, is predicted by C. Russell Epley, general manager of the company's Los Angeles Division.

Epley stated that construction of the new mill was proceeding on schedule. "Barring unforeseen interruptions, the plant should be at capacity operation by April 1957," he said. Work by the building contractors, Rosendahl Corporation of Los Angeles commenced on December 5, 1955. The 45-acre plant-site is situated in the Paramount district, east of Garfield Avenue and north of Compton Boulevard. A Union Pacific siding will serve the new mill.

The supply and erection of the steel is now in progress by the Bethlehem Steel Company, Pacific Coast Division. Epley said he expects the building to be enclosed not later than July 1, and that manufacturing equipment will commence arriving in mid-summer.

The plant will spread over 350,000 square feet and will be of heavy steel construction with transite siding, and will have a built-up flat deck roof. It will be equipped with overhead crane service throughout.

American Brass Company's new mill will produce copper and copper base alloys in the form of sheet, strip, rod, tube and drawn products, as well as special shapes. Annual capacity is estimated at 30,000,000 pounds.

To Occupy New Offices—The Perolin Company, Inc., manufacturing chemists since 1904, has announced that effective May 1 its executive offices and headquarters for its Eastern Industrial, Marine and Export Divisions will be located in the Empire State Building, New York, N. Y. The Western Industrial Division of the firm, which manufactures fuel oil additives and water treatment chemicals, will be maintained at its present location, 1112 West 37th Street, Chicago 9, Ill. The New York office was formerly located at 10 East 40th Street.

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Heil No. 1277 Shell and Tube Exchanger with Nocordal (Impervious Graphite) Tubes

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(impervious graphite)
HEATING AND COOLING UNITS TO WORK FOR YOU

Shell and Tube • Immersion Coils • Electric Units

✓ LONGER SERVICE LIFE . . . NOCORDAL is Practically Immune to Most Strong Acid Solutions

✓ YOU SAVE TIME AND MONEY . . . Pre-Engineered Standard Units in Field Tested Designs

✓ LOWER OPERATING COST . . . Superior Heat Transfer Characteristics, Coupled with Efficient Design

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of RIGIDON (glass-reinforced) or RIGIVIN (rigid vinyl)

Obtain lower initial cost
Eliminate coating failures
Protect and insulate tanks and coils
Minimize part loss caused
From direct shorts

Rigidon Guard

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No matter what the plating . . . no matter how complex or irregular the object . . . there is a "SCOTCH" Brand tape to stop off —positively, cleanly, economically. For instance, No. 470 electroplating tape is strong and conformable; resists the effects of most cleaning and plating cycles . . . is a general "all-around" masking tape for plating. No. 850 Polyester Film tape is very thin and tough; has a transparent backing; is excellent for use on flat or simple curved surfaces; has greater resistance to plating cycle. Where a "thieving" action is desired, No. 420 Lead Foil tape is recommended. For complete information, ask your "SCOTCH" Brand Tape distributor, or write 3M Co., Dept. LF-66

ELECTROPLATING TAPES . . . *three of more than 300 pressure-sensitive tapes for industry trademarked . . .*

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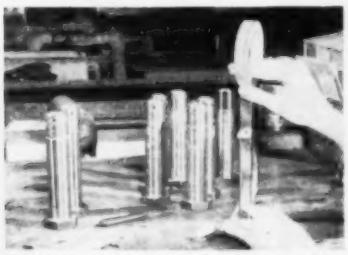
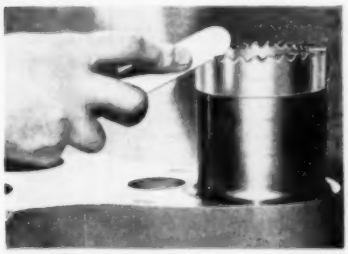
Look what you can do with them!

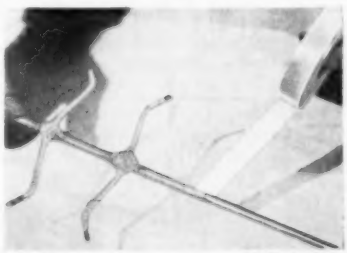
IRREGULAR shapes are easily masked prior to plating with "SCOTCH" Brand Plastic Tape No. 470. Tough, conformable tape follows all contours; safely seals off any area.



THINNESS of "SCOTCH" No. 850 Polyester Tape prevents edge build-up when used to mask bearing surfaces before plating.



ELIMINATE slow, costly wiring of lead sheets onto areas to be masked by using "SCOTCH" Brand Tape No. 420. Tape itself is lead foil with pressure-sensitive adhesive.



SAVE solutions . . . prevent build-up on racks by covering racks with heavy-duty "SCOTCH" Brand Plastic Tape No. 470. All "SCOTCH" Brand Tapes apply easily from roll.

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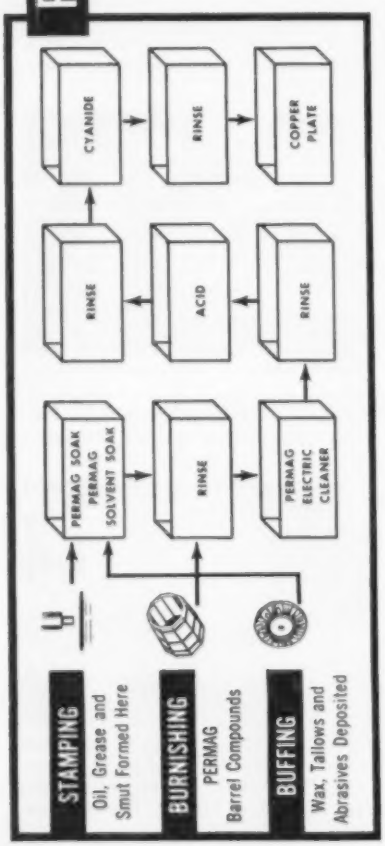

INDUSTRY NEWS

Control Panel—What may well be the world's largest control panel for use in the immersion processing (metal finishing) industry was recently installed by Frederic B. Stevens, Inc. The unit is specifically designed for automatic control of solution temperatures in the anodizing of automobile grilles.

Conditions requiring temperatures ranging up to 300° F can be achieved automatically with the controls provided.

The unit connects a battery of electric heaters capable of generating heat in excess of 350,000 watts. In addition, the controls permit the automatic opening and closing of motor driven valves for supplementary steam heating and water cooling. Use of the latter facilities permit a constant range of termperature varying only 10° F—between 240° and 250° F.

The panel was built to handle up to 1200 ampere a-c current. Normal working requirements run about 1000 amps.

New Plans—Stauffer Chemical Company has announced plans to build a new sulfuric acid plant, which will cost approximately two million dollars at Dominquez, Calif. Construction will begin in May with full scale production scheduled early in 1957.

The company decided to invest in the new project, according to Hans Stauffer, president, "because of the current and anticipated expansion of Southern California's industrial needs for acid."

Stauffer Chemical has, at present, three sulfuric plants in California—at Richmond, Vernon and Dominquez.

Stauffer Chemical Company has also announced that it plans to invest a million dollars in an expansion and modernization of its Niagara Falls, N. Y., plant.

About $400,000 of the total new investment will be for additional facilities to manufacture 73 per cent caustic soda. Approximately $150,000 will be spent to increase output of chlorinated solvents.

The company also plans to extend and improve several existing plant units which are now producing chlorine, caustic soda, titanium tetrachloride, silicon tetrachloride and zirconium tetrachloride.

Work on the additions is now in progress. It is anticipated that they will be in operation by late summer.

Available for Immediate Shipment, Attractive Values

The following excellent rebuilt and guaranteed electroplating motor generator sets and rectifiers, with full control equipment:

PLATERS

1—7500/3750 AMPERE, 9/18 VOLT, **HANSON-VAN WINKLE-MUNNING,** Synchronous.
1—6000/3000 AMPERE, 6/12 VOLT, **CHANDEYSSON,** Synchronous, Exciter-in-head.
1—5000/2500 AMPERE, 6/12 VOLT, **CHANDEYSSON,** Synchronous, Exciter-in-head.
1—3000/1500 AMPERE, 12/24 VOLT, **CHANDEYSSON,** Exciter-in-head.
1—2500/1250 AMPERE, 9/18 VOLT, **ELECTRIC PRODUCTS,** Synchronous, Exciter-in-head, 25°C.
1—2000/1000 AMPERE, 6/12 VOLT, **HANSON-VAN WINKLE-MUNNING.**
1—2000/1000 AMPERE, 9/18 VOLT, **ELECTRIC PRODUCTS.**
1—1500/750 AMPERE, 6/12 VOLT, **HANSON-VAN WINKLE-MUNNING,** Synchronous, Exciter-in-head.
1—1500/750 AMPERE, 12/24 VOLT, **CHANDEYSSON,** Synchronous, Exciter-in-head.
1—1000/500 AMPERE, 6/12 VOLT, **ELECTRIC PRODUCTS.**

ANODIZERS

1—4000 AMPERE, 40 VOLT, **CHANDEYSSON,** Exciter-in-head.
1—1000 AMPERE, 40 VOLT, **CHANDEYSSON,** 25° C.
1—1000 AMPERE, 30 VOLT, **IDEAL,** Exciter-in-head.
1—750 AMPERE, 60 VOLT, **HANSON-VAN WINKLE-MUNNING,** Synchronous, Exciter-in-head.
1—500 AMPERE, 25 VOLT, **CHANDEYSSON,** Synchronous, Exciter-in-head.

RECTIFIERS

1—2000/1000 AMPERE, 6/12 VOLT, **G. E.,** brand new selenium stacks, with "On-load" Automatic Voltage Regulator.
1—**GREEN SELECTOPLATER,** 1800 AMPERE, 12 VOLT, 220/3/60.
1—BRAND NEW 2000/1000 AMPERE, 6/12 VOLT, **G. E.** COPPER OXIDE RECTIFIERS, with Controls.
1—1500/750 AMPERE 6/12 VOLT, UDYLITE-MALLORY
4—1440/720 AMPERE, 6/12 VOLT UDYLITE-MALLORY

SPECIAL

1—TOLLHURST CENTRIFUGAL DRYER, 20" dia. basket, with Steam Heat
1—H-VW-M Full-Automatic Plating Machine, 87' long, 39" lift, was used for copper and nickel.
1—H-VW-M Full-Automatic Plating Machine, 87' long, 39" lift, was used for chrome.
1—Production Pipe Polishing Machine, Model 101, Motorized.
1—**RONCI** Enamelers, No. R-200.
1—MODEL "A" PRESSURE BLAST.

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Lavin specializes in the manufacture of high purity anodes for all electrodeposition products. This minimizes the buildup of undesirable trace elements in the plating solution. These trace impurities can cause subtle, but definite, corrosion problems in the finished product out in the field.
Lavin's metallurgical staff is always ready to assist you in finding the solution of any routine or special electroplating problem. Our chemical and research laboratories are available to you at no cost or obligation. Technical information furnished upon request.

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NEW LUSTER-ON ALUMINUM SEALER
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ALUMINUM SEALER

- ✓ produces a chromate film on aluminum that provides excellent corrosion protection and serves as an ideal paint base
- ✓ is an excellent substitute for anodizing in many applications where hardness is not a prime factor — gives better corrosion protection than anodizing.
- ✓ is easily applied at room temperature by dipping, spraying or brushing — treatment time extremely short.
- ✓ can be furnished in clear, yellow and dyed color finishes
- ✓ gives maximum salt spray resistance
- ✓ adheres well, does not leach easily
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- ✓ meets government specifications MILC-5541

See for yourself the superior results obtained with new Luster-On Aluminum Sealer.

Send sample for free laboratory treatment.

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57 Waltham Avenue, Springfield, Mass.

INDUSTRY NEWS

Talk on Corrosion—Metal corrosion problems and how many U. S. companies have attempted to solve them was the subject of a lecture recently presented before a Mexican technical society, primarily concerned with metal finishing. The talk was given by H. C. Irvin, president of Allied Research Products, Inc., Baltimore manufacturer of the Iridite chromate conversion coatings and ARP plating brighteners. Irvin spoke before the group during an extended tour of Mexico and the U. S. West Coast aviation plants.

The same trip was highlighted by a visit to the L. H. Butcher Company of Los Angeles, Calif. during their annual sales meeting. The meeting was attended by representatives from the entire Butcher network of western offices. A feature of the meeting was a session on Allied's products for which the Butcher Company is the West Coast licensee.

UL Approval—Ansul Chemical Company, Marinette, Wis., announces the approval by Underwriters' Laboratories of three large stationary dry chemical fire extinguishing units, ranging in size from 500 to 2,000 pounds capacity.

The approval was granted after months of testing under all conditions. Henceforth these Ansul extinguishers will carry UL initials in a circle on the nameplate to identify them as a UL-listed type.

Five New Representatives—The Thermo-Panel Division of Dean Products, Inc., Brooklyn, N. Y., announces the appointments of: Cameron Engineering Co., San Francisco, Calif. (E. C. Paul Robinet), to cover the northern half of California, and only the county of Washoe in Nevada.

Allan Edwards, Inc., Tulsa, Okla. (A. J. Edwards, Jack S. Osborn, Bruce B. Pettigrove, Bill W. Jones, C. E. Shilling, Joseph C. E. Schumacher, and Dan B. Mathey) to cover the complete state of Oklahoma, complete state of Arkansas, and the northern part of Texas (panhandle area).

Thermal Specialties Co., Harrisburg, Pa. (B. Zaritsky and Seth B. Wood) to cover the central part of Pennsylvania.

Merlo Steam Equipment, Detroit, Mich. (Anthony A. Merlo, Raymond R. Paschke and Joseph S. Florek) to cover the eastern half of Michigan.

J. F. Munn Co., Pittsburgh, Pa. (J. F. Munn, covering western tip of Maryland; western part of Pennsylvania (approximately one-third of the state); almost the complete state of West Virginia).

New Rep—Swift Industrial Chemical Co. has announced that they are represented in Eastern Pennsylvania, Southern New Jersey, and Delaware by: Acme Engineered Products Corp., 1061-63 Easton Road, Roslyn, Pa.

Engineered for Long Life, Trouble-Free Operation... WALKER SELENIUM RECTIFIERS

Regardless of the type or size of your plating installation, you simply can't beat Walker Selenium Rectifiers for dependable D.C.

These outstanding rectifiers are especially designed to give year in, year out service . . . minimum maintenance . . . no moving parts . . . nothing to wear out . . . nothing to get out of adjustment.

You get more for your money when you use Walker Selenium Rectifiers. Get the complete story, today. Write

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New SCHAFFNER BIAS Buffs

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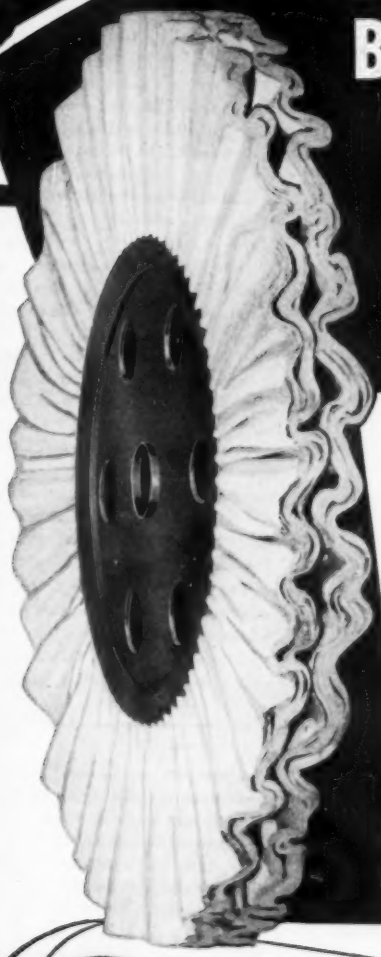

because

- ... FULLY VENTILATED
- ... COOLER RUNNING
- LOW COMPOUND CONSUMPTION
- ... FEWER SECTIONS NEEDED
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- ... LATHE FACED AND BALANCED

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MADE BY THE MANUFACTURERS OF FAMOUS AND ACCEPTED SCHAFFNER NO NUBBIN BUFFING COMPOSITIONS.

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manufacturing company, inc.
SCHAFFNER CENTER • EMSWORTH, PITTSBURGH 2, PA.

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Please send me catalogue and complete information:

NOW PRESENTLY USING _____ Name, Manufacturer and _____
DIAMETER _____ Code No. of Buff _____
CENTER SIZE _____ CENTER SIZE _____
PLY _____ ARBOR _____
NORMALLY I USE _____ SECTIONS PER MONTH _____ COUNT _____
NAME _____ TITLE _____
COMPANY _____ STREET _____
CITY _____ ZONE _____ STATE _____

SCHAFFNER AIR-COOLED METAL-CENTER BUFFS ARE PRICED RIGHT • PRODUCED IN ALL DIAMETERS, CENTERS, PLYS AND COUNTS

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 629.

PERSONALS

Krentel Lupien Boyd Henry

G. Stuart Krentel has been appointed manager of Technical Sales Service for the western region of Kelite Products, Inc., manufacturers of industrial cleaners and cleaning equipment.

Krentel has been associated with several prominent organizations in the metal finishing field prior to joining the Kelite organization.

Albert W. Lupien, former sales manager of the Midwestern area for Kelite Products, Inc., has been promoted to Regional Vice-President for the manufacturers of industrial cleaners and cleaning equipment.

Lupien has been connected with the Kelite organization in California and Illinois for nearly ten years. Prior to this association, Lupien was Treasurer of Associated Research, Inc., a Chicago electrical instrument manufacturing concern.

Lupien is a member of the National Sales Executives' Club.

W. John Boyd, formerly sales supervisor of the Chicago area for Kelite Products, Inc., manufacturers of industrial cleaners and cleaning equipment, has been promoted to Metropolitan Chicago District Sales Manager.

Boyd has been connected with the Kelite organization since 1946.

Gurdon T. Henry has been appointed District Sales Manager in the Ohio area for Kelite Products, Inc.

Henry was formerly connected with Cardox Corporation and is a registered professional engineer of California.

Dr. George McCoy has been named manager of the Pennsylvania Salt Manufacturing Company's Research & Development Department, a major component of Pennsalt's recently created Technical Division. Other units of this division which is directed by Vice-President **W. A. LaLande,** are the Central Engineering, Patent, Commercial Development, and Sales Services Departments.

Immediately before joining Pennsalt in 1944, he was an instructor in organic chemistry at U. of Penn. where he had received his PhD in 1943. During his association with the company, he served successively as senior research chemist, group leader, assistant director and director of organic research.

Joseph J. Duffy, Jr. has been appointed manager of Executive Procurement and Development of the Pennsylvania Salt Manufacturing Company. In this newly created position, Duffy will report to **Fred C. Abbott,** manager of Administrative Services. He will be responsible for the procurement of technical and professional personnel and the coordination of a company-wide executive development program.

Concurrently, it was announced by **Albert H. Clem,** general manager of the Chemical Specialties Division, that **John M. Davidson,** assistant manager of the Metal Processing Chemicals Department, will succeed Duffy. Davidson, a graduate of Dickinson College and one-time chemistry instructor, has been associated with Pennsalt's sales organization since 1946.

Samuel A. Ott has been appointed works manager of the Claymont, Del., plant of The Colorado Fuel and Iron Corporation.

Ott is currently president of the Acid Open Hearth Research Association at the University of Pittsburgh. He is a member of the American Society of Metals, the American Iron and Steel Institute, the American Ordnance Association and the American Institute of Mining and Metallurgical Engineers.

With the integration of United Chromium, Incorporated with Metal & Thermit Corporation some changes have been effected in the personnel. **F. L. Scott** is now manager of Product Application and Evaluation Department, Research Department. He is located at the Research Laboratory in Rahway, N. J. Scott is a member of the Editorial Board of the AES.

The S. A. Day Manufacturing Co., Inc., manufacturers of buffing wheels, buffing compounds and distributors of a full line of polishing and plating supplies announces the appointment of **Paul J. Conn** to the position of sales and service of their Buffalo Plant.

Conn has a wealth of experience both in job and production plating and polishing. He formerly managed the plating plant of McKaig-Hatch, manufacturers of hand tools. Prior to that, he was polishing and plating supervisor of Niagara Tube Products, manufacturers of chrome dinette sets, and Logan Platers, formerly one of the large job plating installations of the area.

With the appointment of Conn to their staff, the S. A. Day, Mfg., Co., has included plating equipment design, manufacturing and installation, to their list of many services for the metal finisher.

Conn

Burnett

Davies Supply and Manufacturing Co., St. Louis, Mo., announces the election of new officers.

A. S. Burnett was elected to the office of vice-president, replacing **R. H. Bobilin** who is no longer associated with the firm. Burnett joined Davies in 1947 as Sales Engineer. He will continue to serve in this capacity and also devote a part of his time to the design of new racks and tanks.

E. F. Conroy, Jr., was elected executive vice-president, a newly created office. Conroy formerly held the office of vice-president.

Those re-elected were **L. A. Davies,** president and treasurer, and **C. E. Miller,** secretary and assistant treasurer.

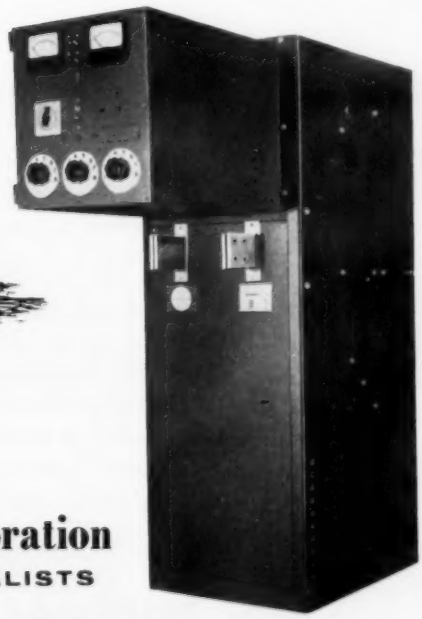
Richard T. Nalle, formerly president of The Midvale Company, Philadelphia, Pa., has been elected a director of F. J. Stokes Machine Co., also in Philadelphia.

Nalle is a director of York Corporation, Pennsylvania Salt Manufacturing Company, Provident Trust Company of Philadelphia and Baldwin Securities Corporation. He is also a former president of the Franklin Institute.

(Continued on page 718)

IT'S SPADE WORK

A lot of spade work comes first before Richardson-Allen starts production on a rectifier. Every problem is given *individual* study in the field by our engineers. Top performance is always assured . . . because Richardson-Allen rectifiers are designed to meet *your* specialized needs. Write today for technical literature on selenium, germanium and silicon rectifiers.



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a Manufacturing affiliate of

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IN CANADA: Richardson-Allen of Canada, Ltd., 1236 Birchmount Rd., Scarborough, Ontario

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99.75% Chromic Acid

to purity

CrO_3 . . . . . 99.75% MIN. SO_4 . . . . . 0.1% MAX.

When a commercial chemical runs 99.75% pure, the user need not ordinarily concern himself about the remaining 0.25%. In chromium plating, however, the 0.25% is important because it includes whatever sulfate is present.

While the maximum amount of sulfate permitted in Mutual Chromic Acid is only 0.1%, average production is well below that figure. Furthermore, the sulfate content varies but little from drum to drum. No other impurity exceeds 0.01%. The balance represents a trace of moisture which, of course, is harmless. This close attention to small details is one reason for the wide acceptance of the Mutual label wherever quality chromium plating is performed.

Sodium Bichromate • Chromic Acid • Potassium Bichromate

MUTUAL CHEMICAL DIVISION

MUTUAL — ALLIED CHEMICAL & DYE CORPORATION

99 PARK AVENUE • NEW YORK 16, N. Y.

Allied Chemical

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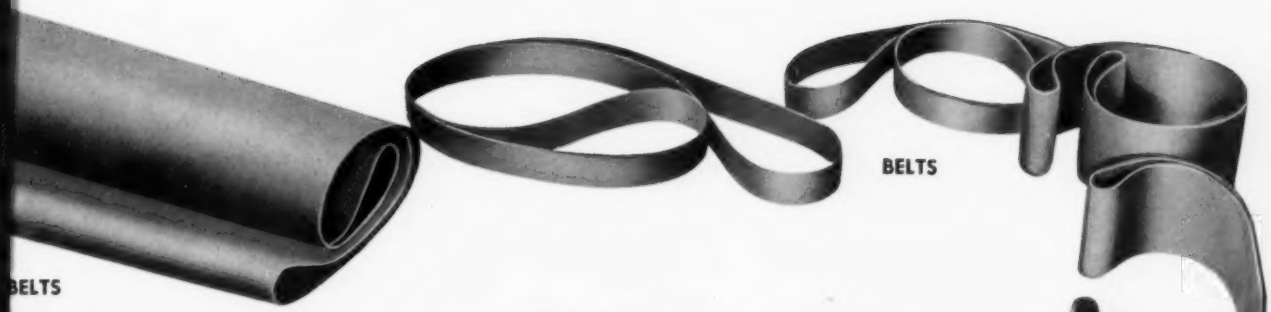

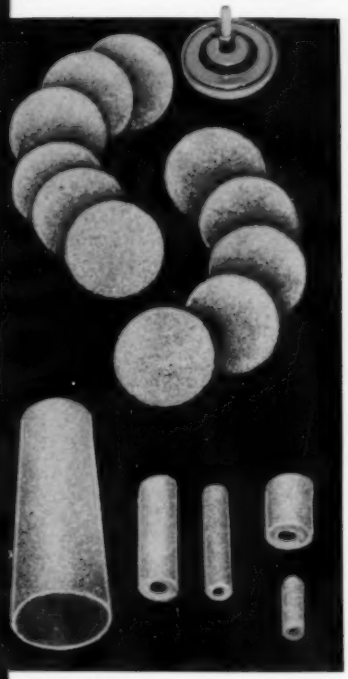

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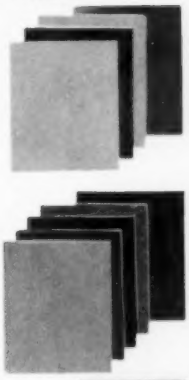
for **sharper** cutting...
for **cleaner** cutting...
for **smoother** finishing...

try the line where you can—

see the difference...
feel the difference...
and **actually prove**
the difference—

ROLLS

SHEETS



Michigan

ABRASIVES

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RED COAT BRAND

MICHIGAN ABRASIVE COMPANY

Manufacturers of

'The Humidity-Controlled Abrasive'

DETROIT 5, MICHIGAN

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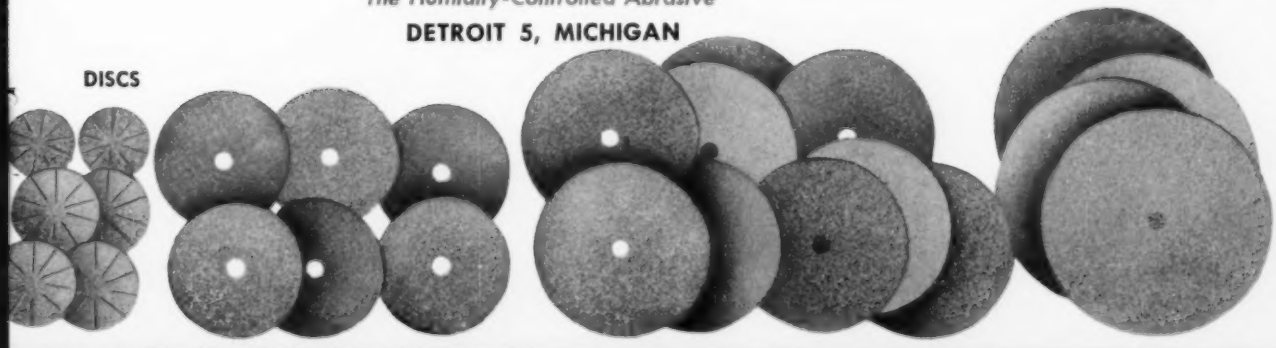

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due to highest grade of raw material and most modern quality control

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PLENTIFUL SUPPLY...
due to unmatched precision-coating equipment and enormous specially-designed blowers and heaters . . . and one of the most modern, single-purpose coated abrasive manufacturing plants in the world . . .

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from wide belts like this to small specialties!

All yours for **Sharper** cutting . . . **Cleaner** cutting . . . **Smoother** finishing Abrasives!

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You SEE the difference because most all Michigan Abrasive products are red in color—*different on sight* from other abrasives!

PROOF you can FEEL the difference

You FEEL the difference because whether you are grinding or polishing, you can feel the stock being removed faster and easier!

PROOF we can PROVE the difference

AND WE CAN ACTUALLY PROVE THE DIFFERENCE in your plant or shop . . . to your conditions and specifications!

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FOR TRIAL DEMONSTRATION!

One of our abrasive engineering specialists will bring proper abrasive products, show you how much more quickly and cleanly stock is removed . . .and finished to your specifications!

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Smoother finishing

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REPORTS FROM ALL OVER . . . STRIPPED, CLEANED, DEGREASED

One of the strangest paradoxes ever to present itself in our economy has occurred now. The economy is a mixed one. In basic production industry, activity is booming. On the other hand, in consumer goods, activity is extremely competitive; while in some sectors, activity is far below normal. Nonetheless, the economy is operating at a level exceeded only twice before: during the peaks of WW II and 1955. Still more paradoxically, the economy seems headed even higher. Spending and demand are increasing. Gross National Product set a new all-time record annual rate of $399 billion despite declines in the auto, agricultural, textile and home-building industries.

In general, businessmen seem confident of long-range growth and are planning to boost capital expenditures to at least $35 billion (22 per cent more than last year). Personal income also is climbing beyond the new annual record of $315 billion.

The cumulative Uniterm Index to US Patents in chemistry, issued in 1955, is available from **Information for Industry Inc,** Wash, DC. Selected patents of chemical interest from the Electrical and Mechanical sections of the Official Gazette also are included. Two copies of the material are placed side-by-side so that highly specific subject headings can be compared with others to define a specific subject of a search. It also includes an Assignee Index, Patent Numbers, Compound Index, etc. An Index covering the electronic field is being prepared. . . . Silver migration in electric circuits (which causes short circuits to be formed): It can be eliminated by use of noble metals, or suppressed by solder dipping, electrocoating, by rigorous cleaning before organic coatings, etc. . . . Plextone, a "completely new" multicolored, color-flecked industrial finish, was advertised by **Maas & Waldstein Co,** Newark, NJ as the "most amazing" finish development in 100 years. The colors are said to exist separately but, when sprayed at one time from one gun, they form an interlacing color network which covers surface flaws and blemishes completely. Finishing costs are claimed to be cut up to 35 per cent. . . . Delpark's combined, fully automatic magnetic separator and filter, for continuous removal of ferrous sludge and abrasives from coolants, was advertised by **Industrial Filtration Co,** Lebanon, Ind, as being the newest, most efficient and most powerful. Featured new method of gravity flow plus magnetic attraction; smaller filter; greater flow capacity, etc. . . . Japanese titanium output is being doubled: **Osada Titanium Co** is increasing its plant capacity from 744 tons at present to 1,124 ton/yr, whereas **Toho Titanium Co** expects to double its present output of 480 ton/yr. Eventually, capacity of both will reach 2,400 ton/yr. . . . Reducing thermal damage in grinding: High work speeds result in lower temps and probably lower residual stresses. In shops where heat-sensitive materials are surface ground, and where trouble is cropping up because of heat checks or perhaps even early fatigue, some way of increasing the work speed should be found. . . . Don't dump that used acid plating solution down the drain, but recover it at a profit: A check of 30 leading firms, using a simple recovery process of concentration by evaporation, disclosed that an average operation, using a 500-gal still, would save $11,900/yr and a 1000-gal still would save $24,999/yr (based on treating 300 batches/yr). . . . Bright gold fired on porcelain enamel: New Bright Gold, 22 kt, preparation by **Hanovia Chem,** Newark, NJ also can be silk-screen printed for rapid reproduction. Firing on enamel at 1100–1500 F burns out the organic vehicle and fuses the metallic film into the enamel. . . . Recent research by **Battelle Inst** revealed elasticity of rhenium decreases with increasing temp up to 900 C in approx linear manner but, at certain pressures, it will remain constant (even when exposed to very high test temps). Annealed rhenium sheet has a yield strength of 131,000 psi, an ultimate ts of 168,000 psi. Rhenium treated by cold swaging, or wire drawing work, hardens more than does rhenium treated by rolling. Rhenium is used as a catalyst for dehydrogenation. . . . The Nimax, new bright nickel electroplating process suitable for iron, steel, brass, copper and other common metals, allows initial polishing of the articles to be cut to a minimum, according to **W Canning & Co,** England. It is also said to give high ductility. The plating solution is operated at 120–130 F in rubber-lined bright nickel electroplating equipment. . . . Direct plating of chromium on aluminum will be used on a new plant just built in England. The method being used in the US is said to yield a ductile coating having excellent wear resistance; average hardness is Rc 72. . . . In running **Commonwealth Engrg Co's** revived gas plating process on a pilot-plant scale last year, the **Army Chem Center,** Md, is said to have discovered a new (and

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now classified) simpler and cheaper method. . . . Of the new Hydroseal centrifugal pumps for transporting abrasive materials (ash, slag, coke, etc), by **Allen-Sherman-Hoff Co,** Pa, one type is lined with rubber, Neoprene or other synthetic material for pumping fine solids, whereas another has wearing parts made of hard metal alloys for handling sharp-edged solids. A clear water sealing system is claimed to minimize frictional wear and eliminate inefficiency of "double pumping."

METAL PRICES

ALUMINUM—(99% pure plus ingot)	25.90¢
BRASS—(Add $.0025 for less than carload lots)	
85-5-5-5 (Ingot No. 115)	40.50¢
80-10-10 (Ingot No. 305)	43.75¢
88-10-2 (Ingot No. 210)	55.75¢
Manganese Bronze (No. 421)	36.25¢
CADMIUM—Platers' shapes	$1.70
CHROMIUM—Electrolytic (99.8% 0.2 Fe), ton	$1.25
COPPER—Electrolytic, domestic	45.87½-46.00¢
Custom Smelters' Price	45.00¢
INDIUM—(Per Troy oz, commercial 99.97%)	$2.25
LEAD—(Common) New York	16.00¢
St. Louis	15.80¢
MAGNESIUM—(Ingot F.O.B. Newark)	35.95¢
(Sticks 1.3 in diameter, 100 lbs or more)	56.00¢
MERCURY—(Per 76 lb small quantities)	$268.00-270.00
NICKEL—Electrolytic Cathodes (sheets loose)	64.50¢
Spot price. Grade F ingots and shot New York 10,000 lb lots	66.92¢
PLATINUM	$103.00-107.00
RHODIUM	$120.00-125.00
SILVER—New York (per oz)	90.75¢
U. S. Treasury price 1,000 fine. Buying price	90.50¢
Selling price, Government owned silver (F.O.B. San Francisco +1.25¢ transportation)	91.00¢
TIN—(Spot Delivery)	97.25¢
ZINC—Hygrade (delivered)	14.85¢
Special Hygrade (delivered)	15.25¢
Die casting alloys	18.00-19.00¢

Revised specifications and tests for electrodeposited metallic coatings Free, (through the courtesy International Nickel Co.)

STANDARDS RELATING TO ELECTRODEPOSITED METALLIC COATINGS

A 164 – 55.	Spec. for Electrodeposited Coatings of Zinc on Steel
A 165 – 55.	Spec. for Electrodeposited Coatings of Cadmium on Steel
A 166 – 55 T.	Spec. for Electrodeposited Coatings of Nickel and Chromium on Steel (Tentative)
A 219 – 54.	Methods of Test for Local Thickness of Electrodeposited Coatings
B 117 – 54 T.	Method of Salt Spray (Fog) Testing (Tentative)
B 141 – 55.	Spec. for Electrodeposited Coatings of Nickel and Chromium on Copper and Copper-Base Alloys
B 142 – 55.	Spec. for Electrodeposited Coatings of Nickel and Chromium on Zinc and Zinc-Base Alloys
B 177 – 55.	Rec. Practice for Chromium Plating on Steel for Engineering Use
B 183 – 49.	Rec. Practice for Preparation of Low-Carbon Steel for Electroplating
B 200 – 55 T.	Spec. for Electrodeposited Coatings of Lead on Steel (Tentative)
B 201 – 55 T.	Spec. for Chromate Finishes on Electrodeposited Zinc, Hot-Dipped Galvanized, and Zinc Die-Cast Surfaces (Tentative)
B 242 – 54.	Rec. Practice for Preparation of High-Carbon Steel for Electroplating
B 252 – 53.	Rec. Practice for Preparation of Zinc-Base Die Castings for Electroplating
B 253 – 53.	Rec. Practice for Preparation of and Electroplating on Aluminum Alloys
B 254 – 53.	Rec. Practice for Preparation of and Electroplating on Stainless Steel
B 281 – 53 T.	Rec. Practice for Preparation of Copper and Copper-Base Alloys for Electroplating (Tentative)
B 287 – 54 T.	Method of Acetic Acid-Salt Spray (Fog) Testing (Tentative)

Sponsored by ASTM and AES and revised to September, 1955

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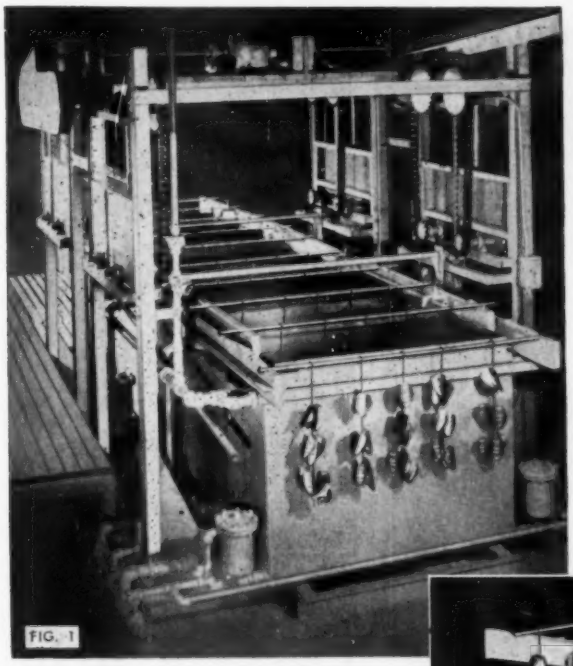


FIG. 1

NEW Automatic TRANSFER MACHINE for Pre-Plate Processing

One unit saves labor of 3 to 6 men.

Extremely flexible—different metals such as steel, brass and even die casting can be processed with the same set-up.

Shops that have BELKE Automatic Transfer Machines use them for most of their work.

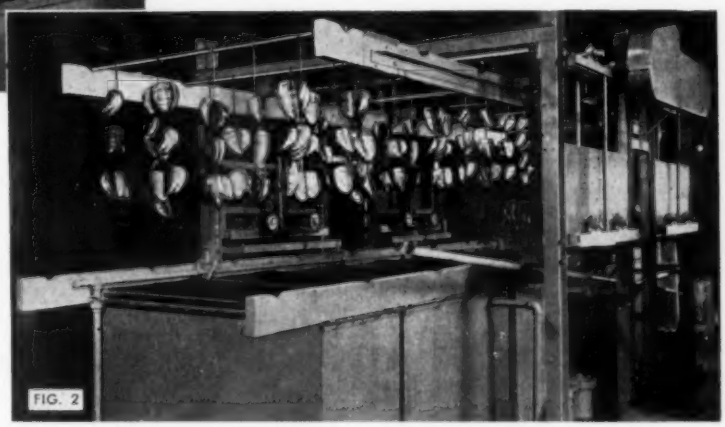


FIG. 2

Fig. 1. Loading End. Loaded racks are hung on rod placed in saddles on transfer frame. At end of each processing period the machine automatically lifts all rods and advances each one tank in the processing cycle.

Fig. 2. Delivery End. Picture shows transfer frame elevated in the transfer operation. When the frame comes down the last rod, which carries parts from the last tank in the processing cycle, will be placed in the unloading saddles on the frame which extends beyond the last tank.

Features

- Affords practically any required cycle for plating, painting, etching, etc.
- Flexible. Easily adjusted to "skip" tanks for processing articles of different basic metals without changing solution.
- Automatic Timing. Easily set for any processing period from 10 seconds to 20 minutes.
- Uniform Processing. The automatic timer doesn't forget — is not called away. Spoilage is avoided.
- Helps Foreman maintain full production. At a glance he can see partially loaded rods or empty saddles—then locate the cause.
- Available with conveyor-equipped plating tank to which processed work is automatically transferred.

The BELKE Automatic Transfer Machine stops the backaches and high labor costs of processing parts for plating.

The machine automatically lifts and transfers work from tank to tank through the entire pre-plating cycle such as electrocleaning, tepid running rinse, anodic electroclean, cold running rinse, acid bath, cold running rinse, cyanide bath, cold running rinse. Practically any cycle can be had.

The Transfer Unit can be adjusted to "skip" tanks as desired for processing articles of different metals such as steel, brass and die castings. This flexibility makes practical automatic processing of a great range of varied work.

For further labor-saving, a conveyor-equipped plating tank can be furnished with the BELKE Transfer Unit. The Transfer Unit automatically transfers processed work to the conveyor and the work is completely plated while moving through the plating tank.

Send for literature or see your BELKE Service Engineer.

Belke Manufacturing Company, 947 N. Cicero Ave., Chicago 51, Ill.

EVERYTHING FOR PLATING PLANTS

The abbot and the Bishop's Candlesticks

The Bishop was upset. How could he possibly have 500 dull, tarnished brass candlesticks polished and gleaming in time for tomorrow's special candlelight services?

The *abbot* was quite calm. He *knew* the answer to the Bishop's dilemma and in less than twenty-four hours, he returned from his laboratory with the candlesticks – bright and glistening.

How did he do it?

Articles made of brass and other metals may be readily burnished and tumbled with Abbott Burnishing Materials. Made in six scientifically designed shapes, Abbott Burnishing Materials make efficient and uniform contact on metal parts and castings of every conceivable size and shape. Economical to use, they are *deep hardened* and have a mirrorlike glass-hard surface for extra long life. Combined with the Abbott Vertical Tumbling Barrel, they make the perfect barrel finishing combination.

If you have a special barrel finishing problem, let the abbot help you solve it. Just write us.

ABBOTT

The ABBOTT BALL Company
1054 New Britain Avenue
Hartford 10, Conn.

PERSONALS

James A. Viola has been appointed to fill an unexpired term on the board of directors at Hanson-Van Winkle-Munning Co.

Viola

Viola is closely associated with the metal finishing company, in that he is currently engaged in directing the H-VW-M program of greatly expanding its rectifier manufacturing facilities and increasing its output of an improved type of germanium rectifier.

He is head of Rapid Electric Co. of New York, being the principal founder of this company when it was organized in 1945. In this connection he has served as consultant and lecturer to various technical groups in the country. He is responsible for a number of patents on rectifiers in the electroplating and associated fields.

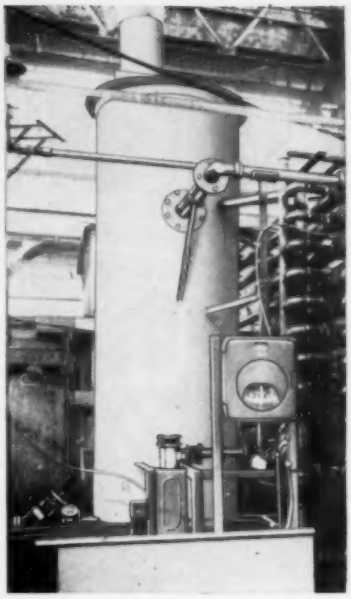
Viola was with the Western Electric Co. from 1941–45 as an electrical engineer. At that time he was engaged in research work on standard frequencies and other phases of quartz crystal. He received a Certificate of Merit from Western Electric as a result of his contribution to new developments and patents.

He is a graduate of the College of the City of New York, receiving his BS degree in Electrical Engineering in 1941.

Walker

Eichler

Two veteran executives of American Smelting and Refining Company were elected vice-presidents by the board of directors at the annual meeting, April 24. **Frederick Walker** becomes vice-president in charge of Federated Metals Division; **Francis H. Eichler** becomes vice-president in charge of the Purchasing Department. Both men will have their offices in the New York headquarters of American Smelting and Refining Company at 120 Broadway where they have been located in recent years.



Chromic Acid Concentrator

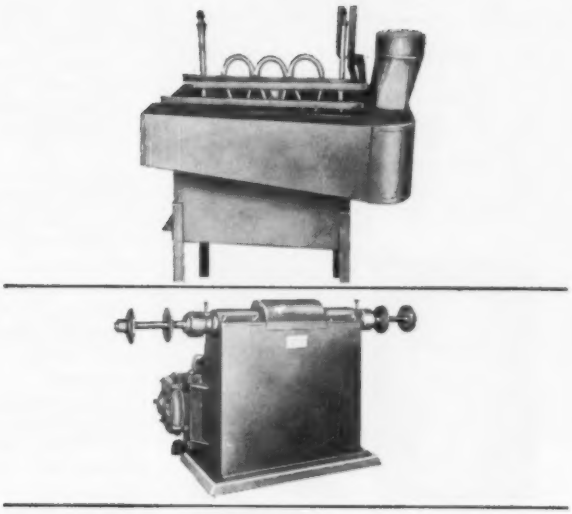
The unit illustrated above is a chromic acid concentrator in use in a large Ohio plating plant. The system of which this unit is the heart is currently recovering 55% of chromic acid formerly lost thru dragout. The plant estimates a $1,650 monthly savings on ferrous sulphate used for treatment, and a $2,500 monthly savings in reduced chromic acid consumption. These figures, however, would vary from operation to operation. In addition to the above advantages, the problem of waste disposal is considerably reduced.

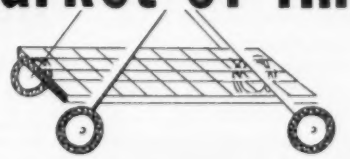
Designed and built by Maurice A. Knight, the unit, the first of its type, has a Sealon lining which has excellent resistance to the corrosive action of plating solutions. Concentrators of this type are also being used for concentrating solutions of nickel plating salts, and may be used for concentrating other plating solutions.

Write for further information regarding the use of a Knight concentrator in your operation.

MAURICE A. KNIGHT
Kelly Ave., Akron 9, Ohio

Acid and Alkali-proof Chemical Equipment





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PERSONALS

A. C. West has been appointed vice-president and director of Canadian Hanson & Van Winkle Co., Ltd., Toronto. West, a graduate in Chemical Engineering from the University of Toronto in 1933, joined the company as chief chemist in 1934, was appointed assistant general manager in 1945 and general manager in 1955.

West

Connors

Richard T. Connors was recently appointed Cowles Technical Man servicing Cowles Aklaine Metal Cleaners and Ty-Bond Zinc Phosphate Metal Coatings in Chicago and nearby cities.

Connors is well known to many in the Chicago area as a result of his long association with the sale of plating equipment and supplies there. He is a graduate chemical engineer from the University of Detroit and has had experience in all phases of metal finishing.

R. W. Preston's appointment to vice-president of the Eastern Branch of National Rack Company is announced. Preston first came to Naraco as a design engineer in 1948. He later went into the company's sales division, where he remained until his recent promotion. In his new duties, Preston will also be assistant to the Eastern plant manager.

Preston

Castellano

Eugene N. Castellano has been appointed chief chemist by Hermetic Seal Products Co. of Newark, N. J. He was research chemist and laboratory supervisor with Bart Laboratories under Dr. Dodd S. Carr until recently. In his new position, Gene will be responsible for plating control and chemical laboratory developments with Hermetic Seal Products Co. Castellano is a graduate of Seton Hall University and he has done graduate work at Columbia University.

Leslie V. Whiton has just announced the opening of an office at White Plains, N. Y. for consultation on matters pertaining to the production and marketing of non-ferrous metals.

Whiton graduated in metallurgical engineering from the University of Toronto in 1931. After ten years at the Trail Smelter of the Consolidated Mining and Smelting Co. of Canada he spent a year with the Aluminum Co. of Canada at the Arvida Smelter. During the next four years with Dominion Magnesium Limited, he was works metallurgist and then sales manager.

In 1946 Whiton returned to the Trail Smelter to be in charge of metallurgical development. In 1950 he transferred to Montreal to study the markets for indium and other metal products of the Consolidated Mining and Smelting Co. After spending three months in Europe at the beginning of 1953 studying metal markets, he returned to Montreal to head up the metal sales development program for Consolidated until he moved to the United States at the end of 1955.

Whiton is a member of several professional organizations including the AIMME, ASM, ASTM and NACE. His broad association with the industry has given him a background of wide experience in matters pertaining to non-ferrous metals. Whiton's address is P. O. Box 432, White Plains, N. Y.

IMPORTANT NOTICE TO MEMBERS AND SUBSCRIBERS

If you are going to move, it is necessary that the proper notification be made at the earliest possible moment, so that you may continue to receive your copies of PLATING without interruption.

Members must notify Branch Secretaries of changes promptly.

Notification should be made to this headquarters by letter, post card, or post-office form No. 22S, give the old address as well as the new, with postal-zone number if any. You should also notify your local post office on postal form No. 22 of your change of address. Both postal forms are obtainable at any post office.

You are urged to advise the PLATING Circulation Department and, in the case of Branch members, your secretary, as soon as you know your new address, preferably three weeks in advance of moving.

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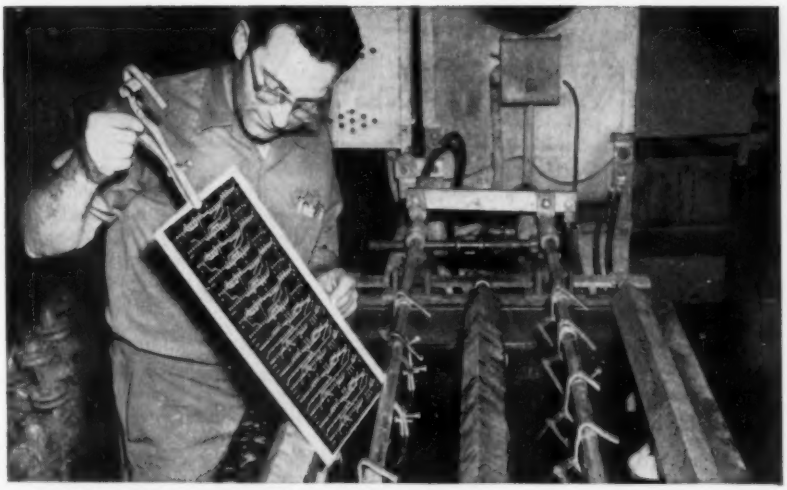
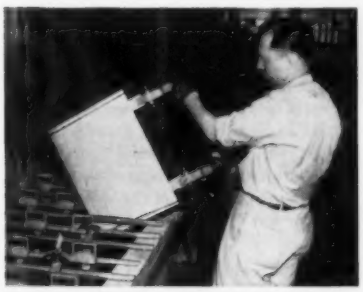
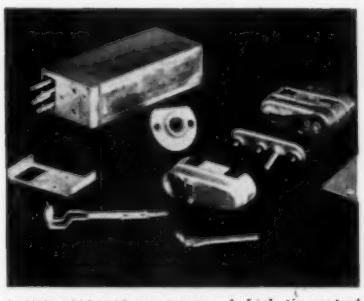


PRINTED CIRCUITS—*Low cost, easily assembled printed circuits for radio and other electronic equipment may be plated economically and efficiently with B&A Copper Fluoborate and B&A Lead-Tin Fluoborates.*

PLATING VERSATILE LEAD-TIN ALLOYS—*Lead-Tin alloys of low tin content can be plated from the fluoborate bath to give excellent protective and lubricating coatings for vital engine parts and bearings.*



PLATING ELECTROTYPE SHELLS—*B&A Tin Fluoborate for plating electrotype shells prior to casting offers an easily controlled bath. A combination lead-tin bath has also been used successfully. The Copper Fluoborate bath is used for high speed forming of electrotype shells.*

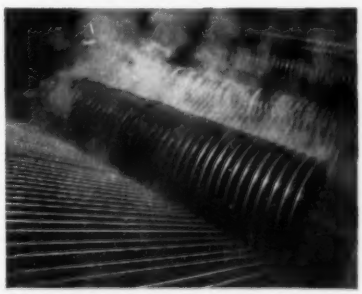


EASILY SOLDERED COATINGS—*A high tin-content Lead-Tin Alloy Fluoborate Bath produces easily soldered coatings on electronic or electrical parts. The Tin-Fluoborate bath can also be used. These uniform deposits help expedite assembly.*

The standout performance of B&A Metal Fluoborate Solutions in Lead, Tin, Iron, Copper, Nickel, Cadmium and Indium plating is news of greatest importance to platers. These B&A products permit far faster plating rates, and provide platers with a host of other advantages not available *in any other plating agents!*

In alloy plating, for example, they offer the only fast, efficient way to plate Lead-Tin and Lead-Tin-Copper alloys — simultaneously — at easily controlled ratios. *In Cadmium plating,* outstanding results are obtained without the hydrogen embrittlement common to other methods. *In Lead-Tin alloy plating,* they produce coatings with excellent solderability that is not destroyed by aging. Other applications include high-speed copper-plating of plastics, copper-plating of steel wire and copper under-coatings prior to nickel plating.

For a descriptive folder, for experimental or commercial quantities, operating data—or for free technical consultation—write or phone your nearest B&A office.



HIGH SPEED WIRE PLATING—*The fast plating rate of B&A Copper Fluoborate makes possible high-speed electrocladding of steel wire. And the Tin Fluoborate bath is used for high speed electro-tinning of copper wire*

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L—600. Films—A 12-page folder listing 38 films on the use of work simplification in industry has been published by the Industrial Management Society.

The folder, titled "Work Simplification on Film" explains the terms by which the 16mm films are available for rental. These films, produced by leading American companies, all have won awards in the annual Methods Improvement Competition sponsored by the Society. Many of the films are in color and sound.

The films are approximately 10 to 15 minutes long in running time and picture "before" and "after" operations of work simplification projects, in both plant and office operations.

L—601. Glass Pipe and Flowmeters—A new catalog published by Fischer & Porter Company, Hatboro, Pa., describes the company's line of glass pipe and fittings. Fabricated from Pyrex brand glass tubing, these pipe and fittings are primarily designed for laboratory or pilot plant use and other special services. Sizes from ¼-inch to 1-inch, internal diameter, are kept in stock for immediate shipment.

In addition, the catalog describes F&P's new threaded metal couplings for metal-to-glass and glass-to-glass connections plus F&P's high pressure glass stopcocks which are offered in spigot type, two-way and three-way designs.

Fischer & Porter Company have also just published a 16-page catalog describing their new glass tube variable-area Flowrator meters. These recently introduced 1700 series meters combine many features and proven principles of previous F&P flowmeters plus added strength, corrosion-resistance, and versatility.

L—602. Portable Plating Unit—Catalog sheets illustrating and describing the Sel-Rex "Jet" Plater—described as a complete electroplating plant in a compact, portable cabinet—have just come off the presses.

The new literature points out that, although the Sel-Rex "Jet" Plater was originally designed for use with Sel-Rex Bright Gold, it is currently being used successfully with a variety of different plating solutions, for both decorative (precious metals) and functional electroplating.

L—603. Heating Coils—Up to the present time there has been no authentic technical information on Dean Thermo-Panel Coils. Now Bulletin 355 is offered.

Subjects included are operating pressures; industrial heating; heat transfer coefficient; choosing Dean Thermo-Panel Coils; pipe coil comparison method; capacity table method; heating problems; determination of delta T; wall and surface losses; material load; spray and makeup loads; pressure drop; number of embossings; weight; charts; conversion tables; etc.

Photographs of coils and assemblies relate to: standard Dean Thermo-Panel Coils; plating tanks; dehydration of pharmaceuticals; heat exchanger types; shelf stand for freezing, drying or baking; bank assembly; furnace heat shield; asphalt tank; anodizing, pickling and plating; spiral embossing; arc-shaped embossing; semi-circular; clamp types; cooling an endless belt; storage of biologicals; and others. On the back cover is a list of 34 typical applications. Possible applications are almost endless.

L—604. Floors—Atlas announces the publication of a new Industrial Floors Bulletin 3-3. This four-page bulletin explains in detail the two standard Atlas corrosion-resistant industrial floors. Complete estimating data is available with a thorough explanation of the differences in construction for both types of floors.

L—605. Testing Instruments—Eighty different devices are covered in a 40-page "Testing-Instruments Reference Book" just published by General Electric's Instrument Department.

Titled the Measurement Equipment Catalog, GEC-1016, the publication contains complete product information including applications, sources of additional information and pictures. Ranging from simple thickness gages to the mass spectrometer leak detector, there are instruments for research, production, laboratories and educational use. Measurement categories include color, leak detection, insulation, and radiation monitoring.

L—606. Automation Controls—The second edition of the Automatic Temperature Control Company's General Catalog is now ready for release to the field. Presented in the new Catalog D-31 is a complete picture of the products and services offered by "ATC" for the field of automation. Some of the products covered are differential transducer control and automation systems, a complete line of time control equipment including electronic, equipment operator mechanisms, valves, counters and electronic contactors.

L—607. 1-150 hp D-C Motors—The General Electric Co. announced that bulletin GEA-6355, 12 pages, illustrated, describes new Kinamatic* d-c motors built to new NEMA standards. Information is given on electrical and mechanical features, versatility of standard line, features for easier maintenance, plus dimensions and ratings. Also available is a new bulletin, GEA-6461, six pages, illustrated, describing Kinamatic generators, ¾ to 100 kw.

*Trade Mark of General Electric Company

L—608. D-C Amplifier—A recently-introduced direct current amplifying instrument is described in a four-page data folder now available on request from Fielden Instrument Division of Robertshaw-Fulton Controls Company.

The folder contains descriptions and schematic drawings of four typical applications of the instrument, as well as general technical information concerning voltage and current amplification. The d-c amplifier is suitable for most industrial and laboratory direct current measuring problems, according to the company. Because it is electrochemical in operation, it has good zero stability, and current as low as a few microamperes can be greatly amplified.

L—609. Relay Specs—A special printing of a 12-page article on Specifying Relays has just been completed by American Machine & Foundry Company. Authored by James F. Rinke, director of engineering of AMF's subsidiary, Potter & Brumfield Manufacturing Co., Inc., the article covers in some detail the various factors that should be considered in selecting an electrical relay for a given application. These factors include circuit characteristics, type of switching, actuation power, operating speed, duty cycle, life expectancy, environmental conditions, physical requirements and cost.

L—610. Plastic Fittings—Its new 12-page catalog, illustrating and describing its line of corrosion-resistant polyethylene and polyvinyl chloride pipe, tubing, ducting, valves and fittings for industrial applications has just been released by the American Agile Corporation.

L—611. Revised and Reprinted—A fifth revision of the 4-page booklet, "A List of 'dag' Dispersions for Industry," listing 41 colloidal and semi-colloidal dispersions for the metalworking, foundry, and related industries, has just been issued by Acheson Colloids Co. These products include dispersions of graphite, molybdenum disulfide, mica, vermiculite, zinc oxide, and acetylene black. Carriers and diluents are given for each product, along with typical applications and important physical data.

New on the list is an improved 'dag' Dispersion No. 213, an alkyd-resin product containing semi-colloidal graphite which forms a durable corrosion-resistant dry lubricating film.

A Timely Message on

Conserving An Unnatural Resource: Executive "Brain Power"

There has been considerable discussion recently about the shortage of manpower and skills: engineers, salesmen and trained labor.

I think some constructive concern with the shortage of top-level executive and management personnel is long overdue.

Now, I consider competent executive ability an *unnatural resource*. It is "unnatural" in that it has to be learned, the hard way, over many years. Granted, some natural traits of personality and attitude can incline a man toward successful business administration. But that's just a good, running start. Things may have seemed tough before. But now, with that final step up—frequently it's more like a flying leap!—the new executive find things unbelievably tougher.

Can he take it? Can he stand up physically to the new job? Who knows? Frequently, we can't tell until it's too late.

The basic solution, I'm convinced, is to prolong executive "brain power" by re-distributing the load. Most important, that load—especially everything that can be classified as "administrative detail"—should be delegated earlier, much earlier, to the junior group. And the junior executive, in turn, should gradually shift detail to his own promising young men.

Of course, the younger man cannot be overloaded. We only want to bend the twig . . . not break it! Nevertheless, if we are to conserve our nation's executive "brain power" for top-level planning and direction, we must delegate responsibility downward, earlier and on a broader basis. That way, we conserve at every state of development.

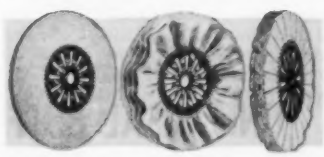
Most important, we prolong the mature executive's work by many valuable years.

Sincerely,

Ben P. Sax

Ben P. Sax

"For the job that's TOUGH—use an AMERICAN BUFF"



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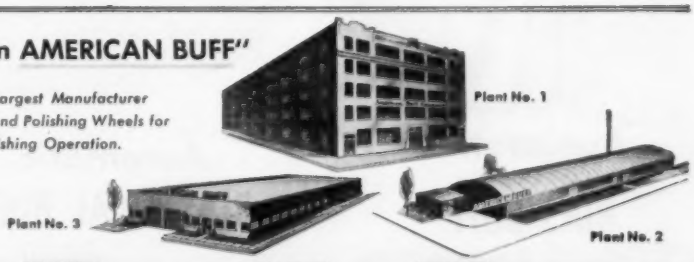

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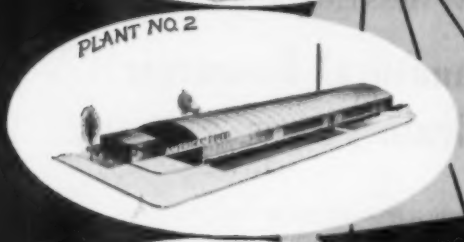

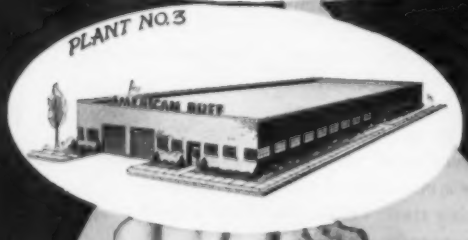

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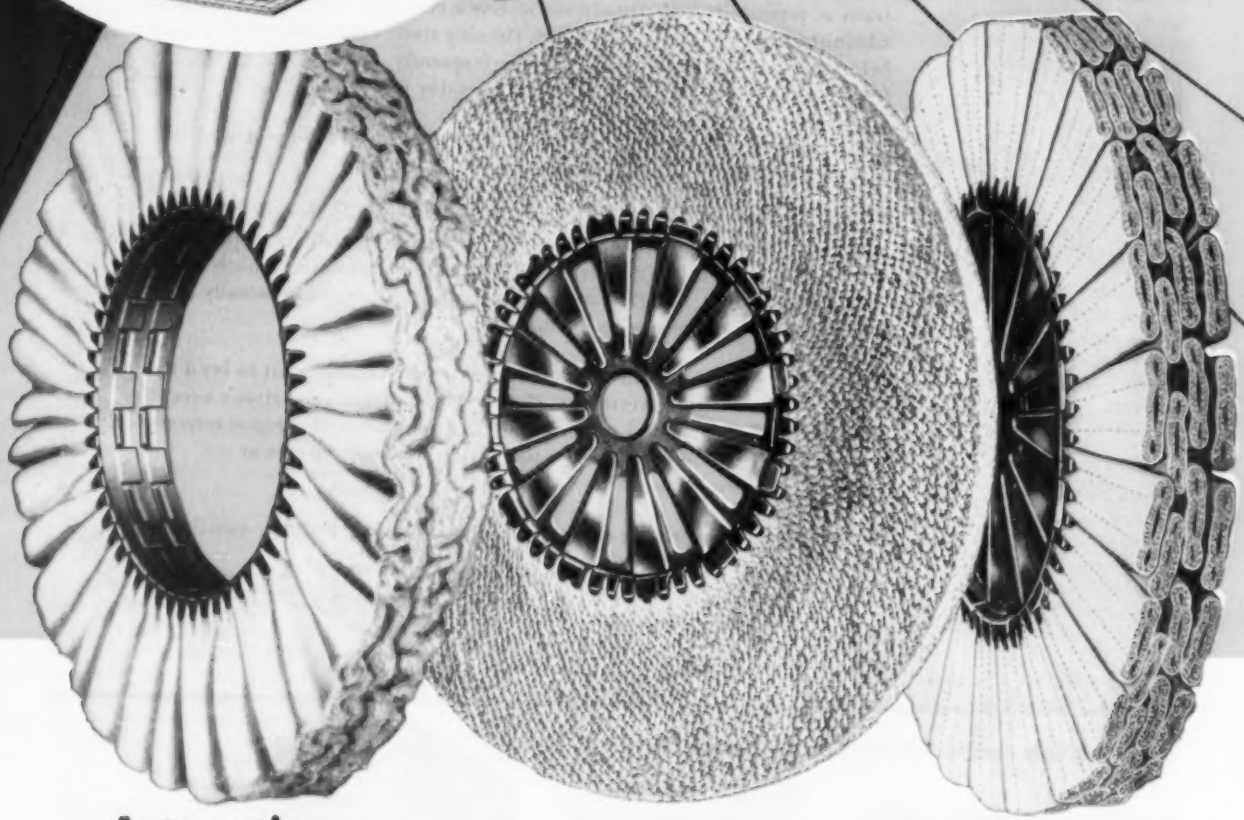

Automatic CENTERLESS BIAS BUFF

This versatile buff does both cutting *and* coloring on a wide variety of metals. Like other American "Automatic" buffs, it features the patented *Centerless* construction with exclusive "Pre-Assembly". Also available with permanent steel or fiberboard centers.

Automatic BIAS SISAL BUFF

Top-quality *all-new* sisal gives this buff unmatched durability and fast cutting. Exclusive "permanizing" process actually *locks fibres together* . . . eliminates scratching and fraying. Available in Centerless model or with Permanent Center.

Automatic UNIT SISAL BUFF

Extra-flexible for fast cutting and finishing on contoured surfaces. Sisal "units", cloth wrapped to prolong wear, follow every crevice and variation in shape. Air-cooled *unit design* prevents burning or discoloration, even at high speeds. In Centerless or Permanent Center types.

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 639.

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use an
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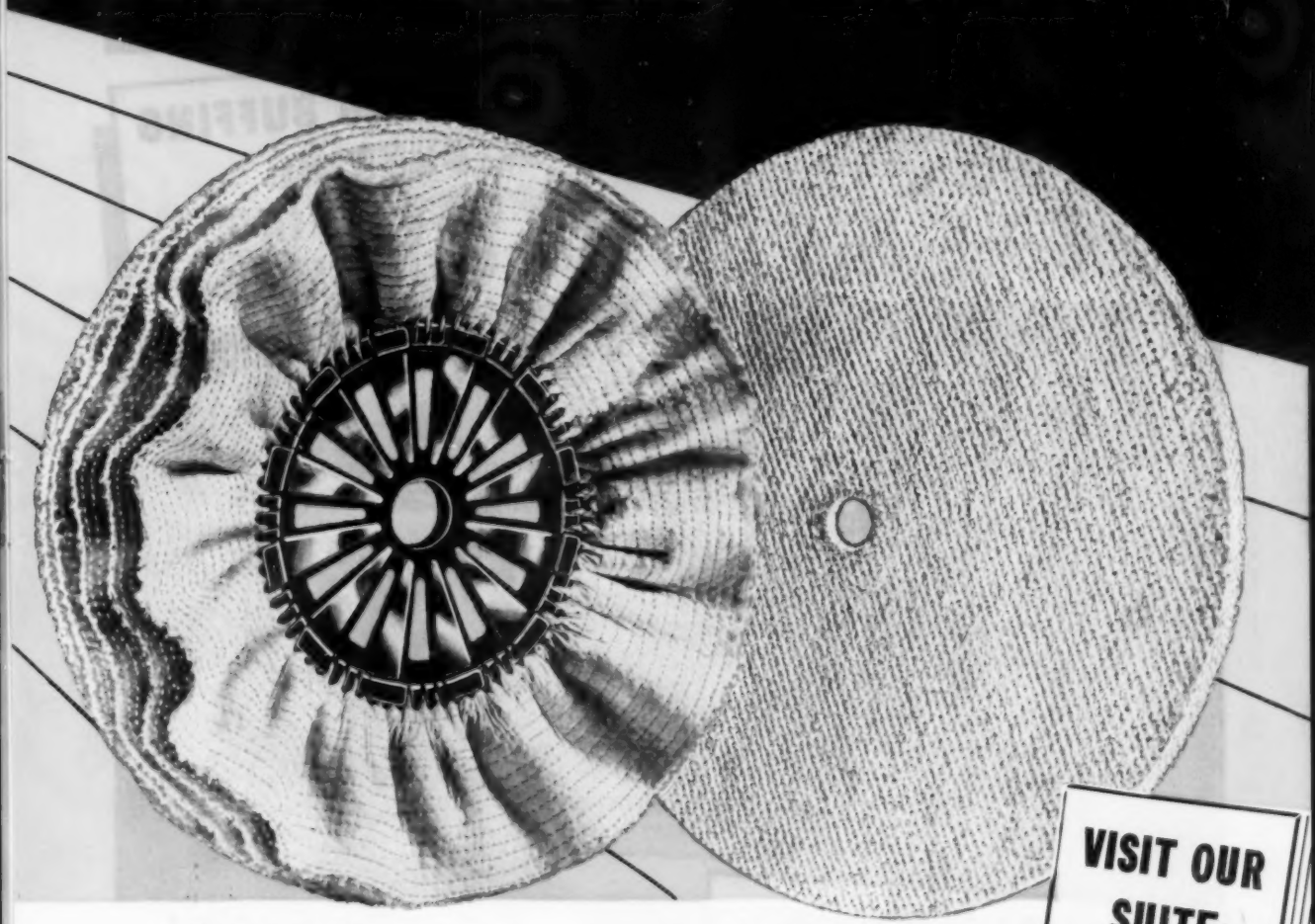

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"OPEN" BIAS SISAL BUFF

Ruffled face eliminates troublesome streaking. New, exclusive "open" design combines the best features of both Bias Cloth and Bias Sisal buffs for fast cutting and high lustre finishing. Made of top-grade "Permanized" sisal, with or without cloth layers—in air-cooled Permanent Center construction.

Conventional
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Top-quality "Permanized" sisal, in a variety of constructions: All-Sisal for even finish; Sisal with Cloth for long wear; Sisal with Krinkle-Kraft Paper for extra-sharp cutting; and Custom-Treated Sisal, for harsh or soft cutting to meet your specific needs.

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Production finishing demands not only high output at low unit cost, but also a uniform finish meeting required standards. Acme Automatics can be depended upon to deliver high production at minimum cost and maintain your finish requirements. Acme performance has been proved in production for nearly half a century.

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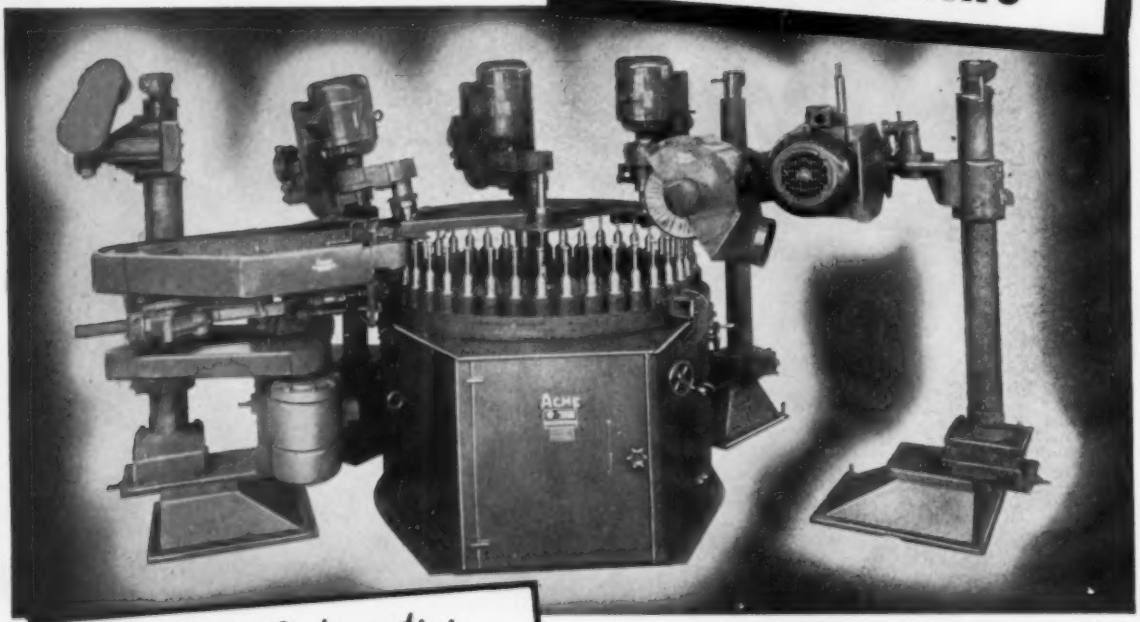

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Catalogs on Request

Recommendations & Quotations

For recommendations, send blue prints of part or samples before and after finishing operations, together with detailed information on finishing operations and production requirements. If production methods will cut your costs, we can set your job up in our experimental processing department and you can inspect the machines in operation.

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The *NEW* MITCHELL-BRADFORD Emulsion Cleaner #26

A NEW organic emulsion cleaner designed for easy removal of heavy oils, greases and soils.

EMULSION CLEANER #26 is a general utility cleaner which cuts cleaning time when used prior to an alkali cleaner. Emulsion Cleaner #26 will even increase the life of the alkali cleaner.

EMULSION CLEANER #26 softens grease and grime for easy removal with a cold water rinse.

EMULSION CLEANER #26 will easily remove buffing compounds and is ideal for cleaning heavy machinery, airplane bodies, truck bodies, floors, etc.

Advantages

1. High penetrating ability.
2. Softens grease and oil for easy water removal.
3. Ideal for cleaning all ferrous and non-ferrous metals.
4. Economical.
5. Long lasting.
6. Used at room temperature.

For Paint Stripping requirements, investigate our, NEW non-inflammable QUICK-STRIP #8

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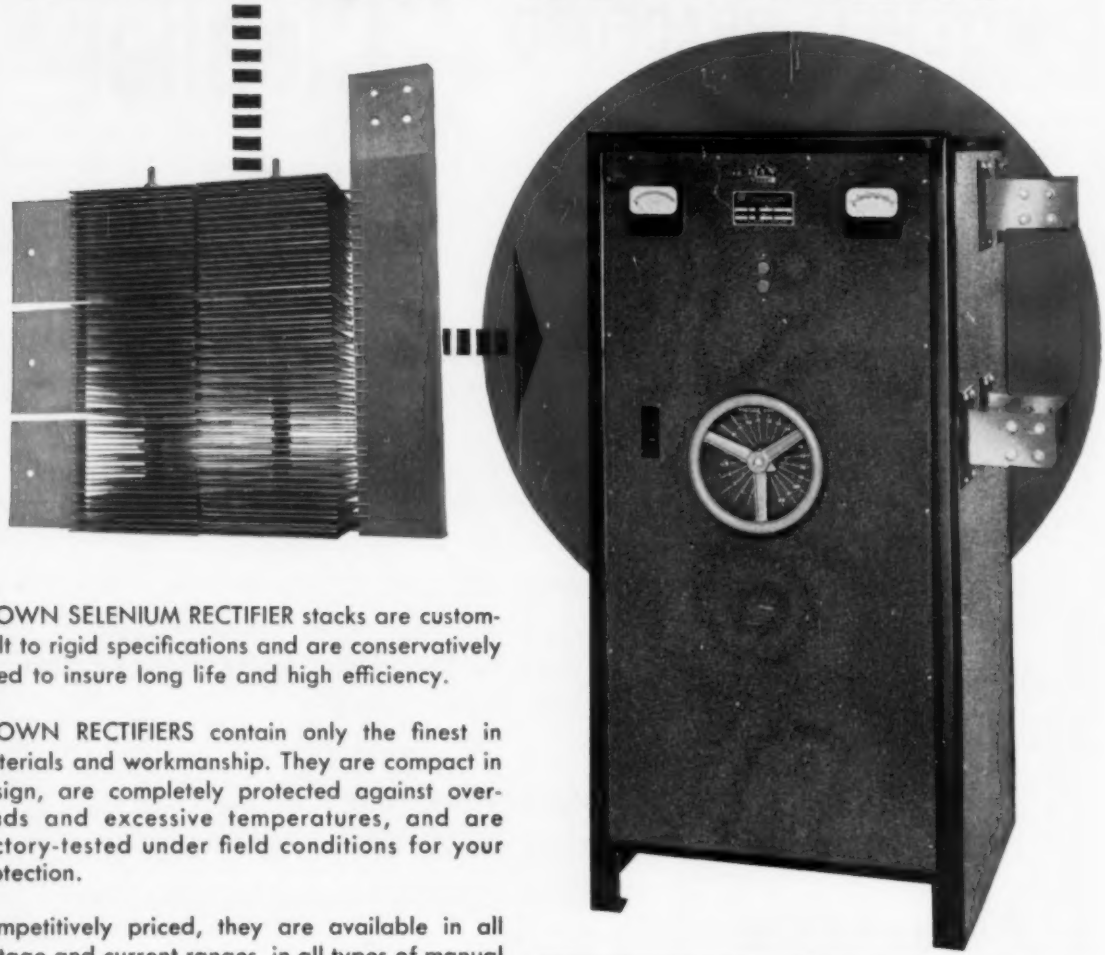
Crown SELENIUM RECTIFIERS



CROWN SELENIUM RECTIFIER stacks are custom-built to rigid specifications and are conservatively rated to insure long life and high efficiency.

CROWN RECTIFIERS contain only the finest in materials and workmanship. They are compact in design, are completely protected against overloads and excessive temperatures, and are factory-tested under field conditions for your protection.

Competitively priced, they are available in all voltage and current ranges, in all types of manual or automatic controls, giving the finest equipment available at low initial cost.

Dependable D.C. Power for Electro-chemical Requirements

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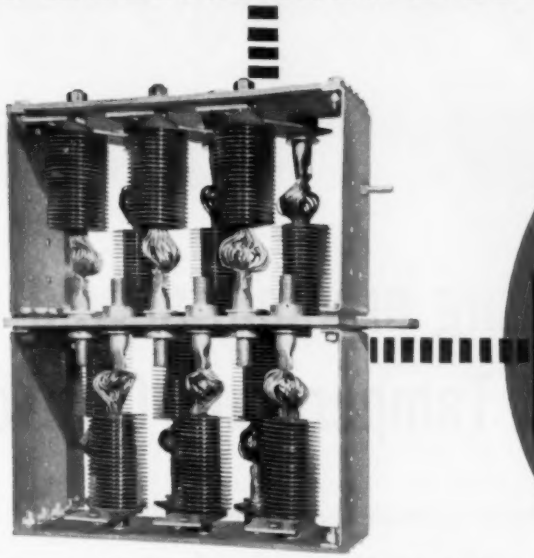

CROWN GERMANIUM RECTIFIERS are high in efficiency, over 90% in some ratings. They contain only selected and pre-tested balanced germanium junctions which are positively protected against current overloads and short circuits.

CROWN RECTIFIERS are designed to give continuous trouble-free service and are factory-tested to perform satisfactorily under all operating conditions.

You can purchase a CROWN GERMANIUM RECTIFIER in any voltage or current range with any type of manual or automatic control at a competitive price, giving you the highest quality at low initial cost.

For more specific and technical information concerning your application, write Crown Chemical and Engineering Co. today...or contact your nearest authorized distributor.

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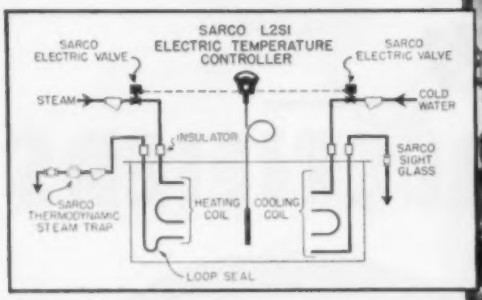
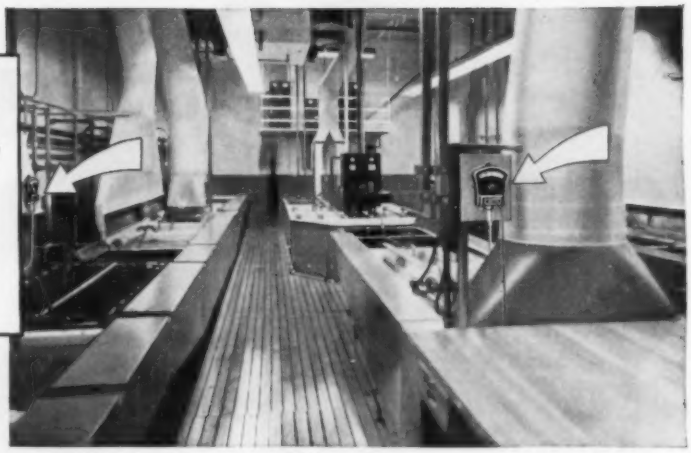
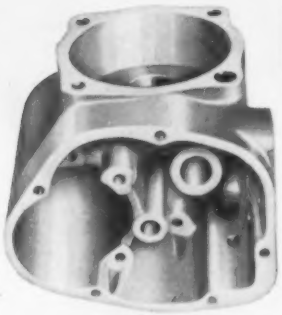




Scientific plating department of Woodward Governor Co., Rockford, Ill., meets exacting government specifications. All plating and cleaning process tanks are equipped with Sarco Electric Indicating Temperature Controllers.

Tough precision plating problem solved by low-cost Temperature Control



0.0002" tolerance held by Woodward Governor in plating irregular and deeply recessed surfaces

PROBLEM—Look at the above case for an aircraft propeller governor. Its irregular shape and deep recesses present a tough plating problem.

Furthermore, Uncle Sam specified a top quality plate with a thickness tolerance of 0.0003 to 0.0005 inch... to assure mating of parts.

SOLUTION—Key to the solution of this precision plating problem is control of all the variables...and by far the most important is *bath temperature*. When it fluctuates, so does the plate quality... current density is affected...and, therefore, throwing power varies, causing uneven plate thickness.

That is why *all* Woodward Governor plating tanks are equipped with Sarco Electric Indicating Temperature Controllers, which automatically hold the plating solutions to $\pm \frac{1}{2}^{\circ}$F.

RESULTS—A top-quality deposit. Throwing power that assures uniform plating thickness on all surfaces... plane, irregular and recessed. Tolerance of 0.0002 inch...actually closer than government specifications. Minimum rejects.

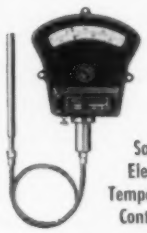
Mr. Delbert L. Zeigler, plant manager of Woodward Governor, writes: "Sarco Electric Temperature Controls are doing an excellent job in every way."

Write for Handbook No. 6 or consult your plating supplies jobber. Sarco Company, Inc., Empire State Bldg., New York 1, N. Y.

2130-B

SARCO

improves product quality and output



Sarco Electric Temperature Controller

ADVANTAGES FOR ALL TYPES OF PLATING

LOW COST—about $100

EASY ADJUSTMENT—turn one knob to change temperature setting

ELIMINATES DIFFICULTIES often caused by unreliable manual temperature control:

- Changes in current density
- Variations in plate thickness
- Variations in quality
- Dull finishes
- Breakdown of plating solutions
- Crystallization of salts
- Rejects

LIQUID COOLED GERMANIUM POWER RECTIFIERS

By
J. T. CATALDO*

Figure 2—New liquid cooled germanium power rectifier. See text for rating

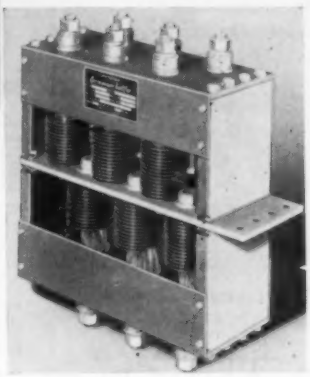


Figure 1—Forced air cooled germanium power rectifier. Rated 1500 amps output in a dual three-phase, half-wave circuit with interphase transformer

With the advent of alternating current for electrical power arose the need for conversion equipment. As the years passed, many various types were developed. The principal methods employed in the United States for the conversion of a-c into d-c power may be generally grouped into four classes: (1) Rotating equipment, which includes the synchronous converter and the motor generator set; (2) thermionic rectifiers, which include the vacuum, gas-filled or vapor filled hot-cathode tube, or the pool-cathode tank or tube; (3) mechanical rectifiers and (4) metallic rectifiers, which include the copper oxide, magnesium copper sulfide and selenium.

Each of these found its own niche in industry, depending on its particular characteristics and advantages. In the development of new rectifiers, attempts were made to develop units approaching the ideal rectifier, i.e., zero forward resistance and infinite reverse resistance. The newest and nearest approach to date for power conversion is the germanium power rectifier. Although other earlier types of converters have equivalent efficiencies, certain disadvantages preclude their continued use.

Early last year fan cooled germanium power rectifiers were put into mass production. A typical unit rated to deliver up to 42 v d-c at 1500 amps when connected as a dual three-phase, half-wave unit with an interphase transformer is shown in Fig. 1.

To meet the industry demands and requirements, the author's company recently developed a complete line of liquid cooled germanium power rectifiers. Fig. 2 shows a 30 kw liquid cooled unit which occupies a volume of only 190 cubic inches. This unit is designed as a universal type rectifier for use in various types of circuits. This versatile unit may be readily connected as a three-phase, half-wave unit; six-phase star; three-phase center tap; dual three-phase, half-wave with interphase transformer or a single-phase, half-wave unit. Depending on the circuit used, output currents of 540 to 900 amps can be obtained. It can be supplied for input voltages of 26 to 66v rms maximum per series junction.

The unit, shown in Fig. 2, is the basic design of a complete series of liquid cooled germanium power rectifiers. They are produced in any of the circuits of Fig. 3.

CHARACTERISTICS

The germanium power rectifier has superior characteristics over other types of metallic rectifiers for high current and medium voltage range. The low leakage current and low forward voltage drop are illustrated in Fig. 4. These characteristics explain the high efficiencies attainable with germanium power rectifiers.

Depending on the circuit and voltages required, rectifier efficiencies as high as 97 per cent are attainable. Other outstanding features are small size and unlimited life. No measurable increase in forward voltage drop or reverse current has been noted after 12,000 hours of continuous operation at rated current and voltage. This is indicative of the nonaging properties of germanium power rectifiers and is equivalent to 1500 working days (approximately 3 years) of operation at eight hours per day. Another very important characteristic of germanium power rectifiers is that there is no change in characteristics after storage, i.e., no reforming is required after extended periods of non-operation.

* International Rectifier Corp.

COOLING

The liquid cooled germanium rectifier series is designed to operate with many of the commercial coolants. Liquid cooling should be supplied to the special heat exchanger assemblies at inlet coolant temperatures not exceeding 30° C and at flow rates of approximately three gallons per minute for water. The flow rate for other coolants such as trichlorethylene and butyl alcohol is dependent on the specific heat, thermal conductivity, and viscosity. Germanium power rectifiers are thermally rated like most electrical and electronic components. Consequently, if the ambient temperature exceeds 35° C for forced convection cooled units, the unit must be derated in accordance with Fig. 5. For liquid cooled units, when coolant inlet temperatures in excess of 30° C are necessary, the manufacturer should be consulted.

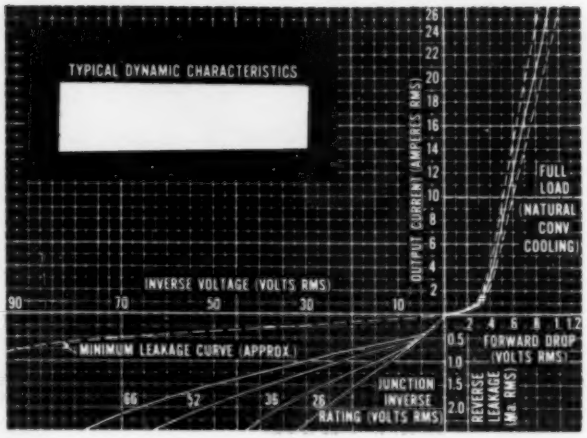

TYPICAL DYNAMIC CHARACTERISTICS
OUTPUT CURRENT (AMPERES RMS)
FULL LOAD (NATURAL CONV COOLING)
INVERSE VOLTAGE (VOLTS RMS)
MINIMUM LEAKAGE CURVE (APPROX.)
JUNCTION INVERSE RATING (VOLTS RMS)
FORWARD DROP (VOLTS RMS)
REVERSE LEAKAGE (Ma. RMS)

Figure 4—Typical dynamic characteristic curves

CIRCUIT DIAGRAMS

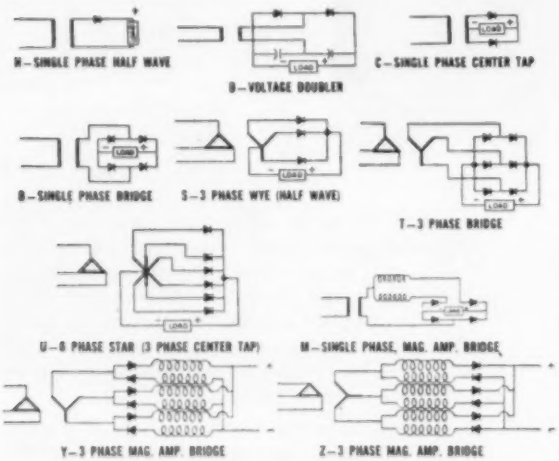

H—SINGLE PHASE HALF WAVE
D—VOLTAGE DOUBLER
C—SINGLE PHASE CENTER TAP
B—SINGLE PHASE BRIDGE
S—3 PHASE WYE (HALF WAVE)
T—3 PHASE BRIDGE
U—6 PHASE STAR (3 PHASE CENTER TAP)
M—SINGLE PHASE, MAG. AMP. BRIDGE
Y—3 PHASE MAG. AMP. BRIDGE
Z—3 PHASE MAG. AMP. BRIDGE

Figure 3—Typical rectifier circuits: International germanium rectifiers are made in all circuit types, including those illustrated. It is possible to arrange them in series and in parallel to increase voltage or current ratings. Like all other semiconductor rectifiers, they must be carefully matched for series or parallel operation for the following reasons: (1) Connected in series, leakage current-voltage thermal characteristic must be matched to insure equal division of reverse voltage over the voltage and thermal operating range. (2) Connected in parallel, forward current-voltage drop thermal characteristic must be matched to insure equal division of load current to increase output current capacity. Two junctions in series or in parallel (not both) are considered to be maximum combinations at the present time. Requirements for higher voltages: Two insulated transformer secondary windings supplying two rectifiers assemblies, with output connected in series. Requirements for higher current output rating: Insulated secondary windings supplying two rectifier assemblies with output paralleled through an interphase transformer to improve commutation and minimize heating

APPLIED A-C VOLTAGE

The maximum applied a-c voltage should not exceed the rated rms voltage of the unit, even for a short duration line surge. Care should be exercised in the design of equipment to prevent voltage surges above this value. In addition, this rms value is based upon sine wave voltage forms, therefore, if a high peak wave form is involved, the peak of the a-c voltage applied should not exceed the rated rms voltage multiplied by $\sqrt{2}$.

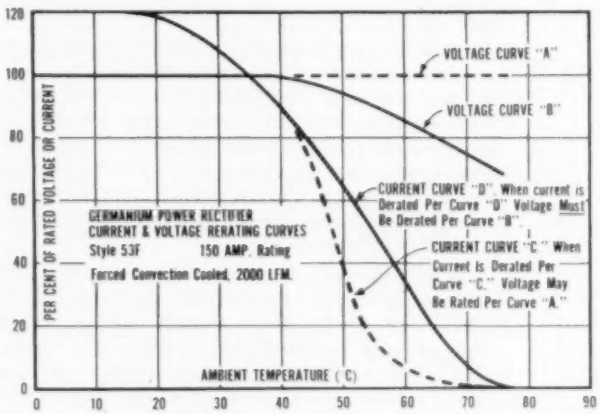

PER CENT OF RATED VOLTAGE OR CURRENT
VOLTAGE CURVE "A"
VOLTAGE CURVE "B"
CURRENT CURVE "D". When current is Derated Per Curve "D" Voltage Must Be Derated Per Curve "B".
CURRENT CURVE "C." When Current is Derated Per Curve "C." Voltage May Be Rated Per Curve "A."
GERMANIUM POWER RECTIFIER
CURRENT & VOLTAGE RERATING CURVES
Style 53F 150 AMP. Rating
Forced Convection Cooled, 2000 LFM.
AMBIENT TEMPERATURE (°C)

Figure 5—Derating curves

OVERLOADS

The new liquid cooled germanium power rectifier is applicable for all types of d-c load requirements except those requiring heavy surge currents and those subject to heavy intermittent overloads or occasional short circuits. Intermittent overloads on forced air cooled and liquid cooled germanium power rectifiers are permitted up to the limiting values indicated by the curves in Fig. 6, but not in excess of these limiting values. Where the overloads

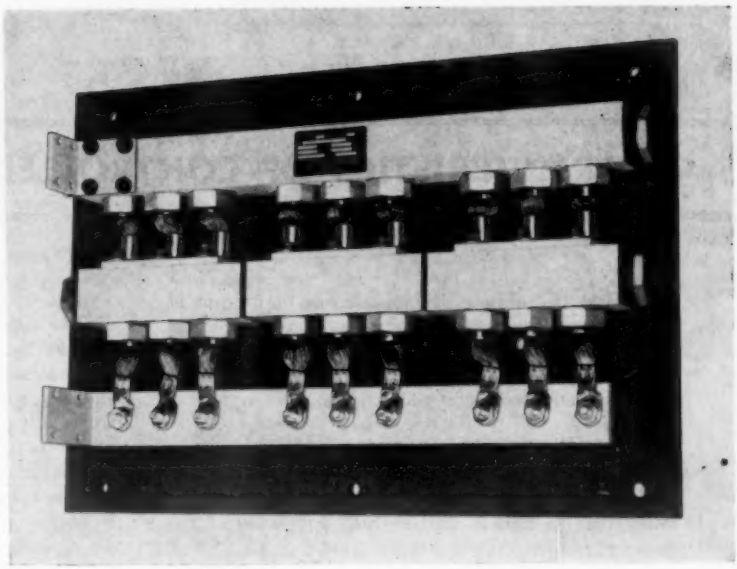
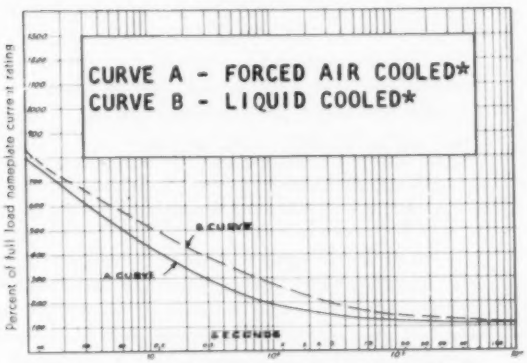


Figure 7—Three-phase bridge liquid cooled germanium power rectifier. Rated 66 volts rms maximum input. Will deliver 1250 amperes at 85 volts d-c. Eight cubicles with these germanium power rectifiers have been installed by an equipment manufacturer to deliver 10,000 amperes

Figure 6—Germanium power rectifier typical overload curves for intermittent duty


CURVE A - FORCED AIR COOLED*
CURVE B - LIQUID COOLED*
Percent of full load nameplate curre nt rating
Maximum overload operating time [cycles [at 60Cps]

*NOTE: Protective devices must open the AC Supply within maximum time shown by curve

are repetitive they must be thermally evaluated to insure that maximum operating temperatures are not exceeded. Unlimited operating life can be expected over a temperature range of −55° C to 75° C maximum when equipment is designed to operate within specified voltage, current and temperature rise ratings. This temperature range provides ample safety factor for all normal industrial and commercial applications.

By proper circuit design, germanium power rectifiers may be produced to deliver up to 250,000 amps at medium voltages. As will be noted, the liquid cooled germanium rectifier offers advantages of smaller size, more efficient cooling and higher heat storage capacity for intermittent overloading. Based on these superior characteristics, this new rectifier opens many new fields heretofore impossible by other methods of rectification.

J. T. Cataldo was born August 22,1914 in Providence, R. I. Cataldo received his BME degree from Clarkson College of Technology in 1937 and BEE degree from Brooklyn Polytechnic Institute in 1945 with supplementary graduate studies at Rutgers and Brooklyn Polytechnic.

An employee with the Government since 1939, Cataldo served as Ass't Chief of the Instrument Section at the Material Lab., N.Y. Naval Shipyard until 1948. He then joined the Signal Corps Engineering Labs., Fort Monmouth, N. J., as a research and development engineer. He is presently employed by International Rectifier Corp. as Electronic Engineer.

Since 1945, many of his articles have been published in engineering, radio and electronic periodicals. He has presented 50 papers on the theory and application of selenium rectifiers. He has been granted one patent and has five patents pending related to his work. Cataldo is a member of both the AIEE and IRE and has been serving as a member of the AIEE Metallic Rectifier Committee.

J. B. Mohler

CHARACTERISTICS OF CONTROLLED RINSE TANKS

The fact that rinsing has appeared as the subject of articles in two standard reference works[1, 2] in the past year indicates that the importance of rinsing is being recognized. Also lively interest in a recent symposium on rinsing[3] and a recent editorial[4] may be cited as further evidence.

Equations are available to calculate the behavior of rinse tanks. However, it is the purpose here to point out that a new instrument is available to solve rinsing problems, rather than to explore mathematical expressions of the theory of rinsing.

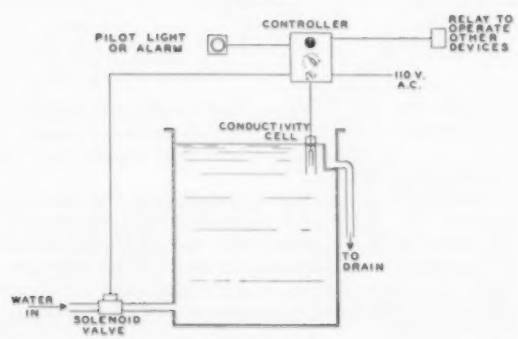
The instrument itself is old, but the specific modification designed for automatic rinse tank control is new. The instrument, generally known as a Solubridge controller, consists of a Wheatstone bridge circuit designed to actuate a solenoid valve, warning, indicating or controlling mechanisms on unbalance of the circuit. A cathode ray tube is used to indicate balance so that the instrument can also be used as a measuring device.

This instrument has been readily accepted in industry due to the fact that substantial savings in water costs have resulted from many of the installations.

Insufficient information exists on actual concentrations in rinse tanks. With the uncontrolled rinse tank there is little point in determining such concentrations due to continuous fluctuations of the soluble chemical content. It is important to know the allowable maximum concentration, but it is impractical to make measurements without control. General practice is to use a safe excess of water.

There are many advantages to the conductivity method of studying rinse tanks. The method is rapid, accurate for dilute solutions and standards are permanent.

Figure 1.



AUTOMATIC CONTROL

Since automatic control is available, it is desirable to consider the characteristics of the controlled rinse tank. For a running rinse tank, automatic control would be installed as shown in Figure No. 1. The line operated controller will allow water to flow for overflow concentrations above the set concentration and shut the water off for concentrations slightly below this setting. The controller will also turn on or shut off pilot lights or warning devices. In addition it can actuate a relay for operation of any other device, such as stopping the rotation of a barrel in a rinse tank.

THE RUNNING RINSE

For the manually controlled running rinse tank, water is allowed to flow continuously at a valve setting. If the racks enter at equal intervals of time and if drag-in is reproducible, an equilibrium will be reached.

salt in = salt out
salt in = drag-in per rack x concentration
salt out = flow per rack x concentration

This can be expressed by the equation:

$$DC_1 = FC_2$$

D = volume of drag-in
F = volume of flow
C_1 = concentration of solution dragged in
C_2 = average equilibrium concentration in rinse tank

The following form is also convenient:

$$R = \frac{C_1}{C_2} = \frac{D}{F}$$

R = rinsing ratio

This shows mathematically that for a given concentration in the rinse that the flow is directly proportional to the drag-in.

If the drag-in is stopped the concentration in the rinse will drop according to the equation:

$$\log C = 2 - \frac{F}{2.3}$$

C = per cent of concentration at time zero
F = total flow

This is shown graphically in Figure No. 2. The solid line is the general case for the equation and will apply to any rinse tank. Data for two different cases measured by

the conductivity method are shown. If the data follow the curve, it would indicate that good mixing had been obtained. For the two cases studied, the indications are that mixing was good due to normal flow of water through the tanks.

This graph also shows the drop in rinsing efficiency if the tank is allowed to flow.

The ordinate of this graph may also be read as per cent rinsing efficiency. For instance, after a flow of one tank volume, the rate of washing away of soluble salts will be at 37 per cent of the original rate and thus will require 2.7 times as much water to remove the same amount of salts as at the original concentration.

RINSING EFFICIENCY

Saving of water is important not only for water cost, but also to keep the requirements for water lines and sewers to a practical minimum. Water shortages often necessitate the efficient use of water, and concentrated rinse waters simplify waste treatment methods.

Since it is possible to control a rinse tank at a definite concentration, it is desirable to study the characteristics of rinse tanks to determine the most practical rinse concentrations. The rapid readings obtained by the conductivity method are useful to study rinse tank behavior.

An example of results obtained in a few minutes is shown in Table No. 1. The object of the experiment was to determine the rate of mixing in a still tank. A small tank and a small basket of work was used for convenience. The tank was 9 inches deep and the conductivity cell was 3 inches off the bottom. The basket of work was suspended just below the solution level. The results show that the salt solution flowed readily to the bottom of the tank and that the high concentration from the initial flow dropped rapidly and then leveled off. The bottom figure shows the equilibrium concentration obtained by agitating the solution.

Tables No. 2 and 3 are repeat experiments for the same conditions, but with water flowing. The salt readily flows to the bottom of the tank, but mixes to approximate equilibrium in 30 to 45 seconds. The bottom figure shows the difference in measured concentration and equilibrium concentration after 150 seconds.

Table No. 4 shows the normal concentration drop for the same tank for five minutes flow without work introduced.

These experiments indicate that rinsing efficiency is good even in a still tank and that mixing takes place readily with a small flow of water. The introduction of water into the bottom of the tank keeps the concentration at the bottom slightly below the average concentration.

STANDARDIZATION OF RINSE WATER

Rinse tank conductivity data are most useful when the rinse water is calibrated in terms of the solution dragged in.

Calibration of New Castle city water is shown in Figure No. 3 for three different solutions.

Over a one year period this water will vary in total hardness from 50 to 170 ppm. The hardness consists mostly of calcium bicarbonate and the pH is adjusted to 8.0.

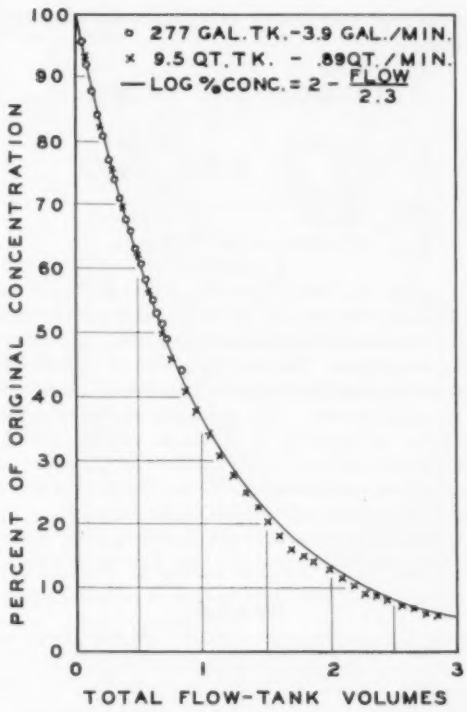
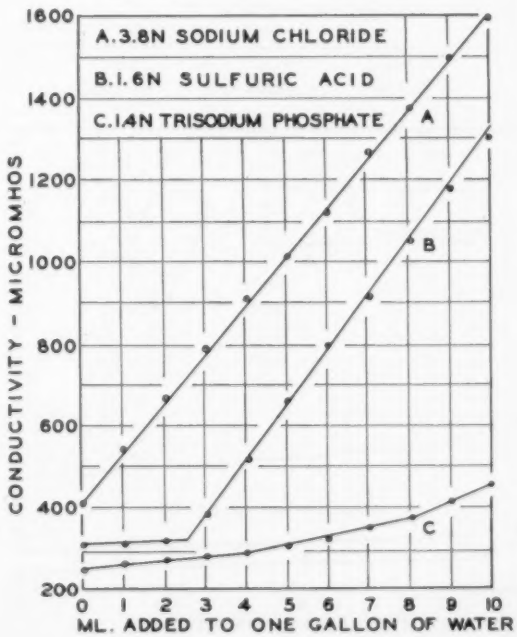


Figure 2.

Figure 3.



For the third week of July 1955 the average analysis was as follows:

Color	3
Turbidity	0.05 ppm
pH	8.0
Hardness	132 ppm
Iron	0.01 ppm
Manganese	nil
Fluorine	1.0 ppm
Alkalinity as $CaCO_3$	63 ppm

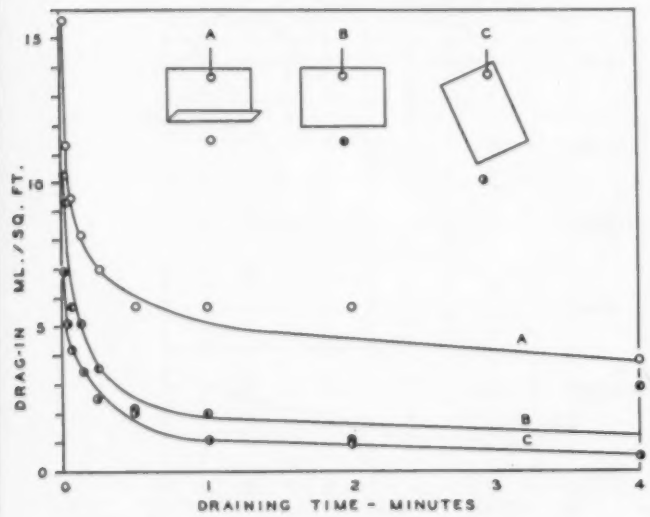
It can be seen from Figure No. 3 that the water has a neutralizing effect on sulfuric acid. There are two breaks in the trisodium phosphate curve indicating neutralization and precipitation. Beyond the points of neutralization and precipitation, the conductivity is directly proportional to the concentration. The same data over a wider range are given in Table No. 5. Linearity will not extend to concentrated solutions, but it will hold for the dilute solutions encountered in rinsing. Beyond the point of neutralization two points will establish a calibration.

A simple calibration is useful in order to know the concentration of the rinse and as a basis for drag-in studies.

DRAG-IN

Drag-in curves for two positions and two shapes of a 6½ inch x 4 ⅛ inch tin coated steel sheet and trisodium phosphate solution are shown in Figure No. 4. Each point represents values for 2 or 3 separate experiments. The effects of position, shape and draining time are readily apparent. It can be seen that draining times of less than 15 seconds will generally result in twice the water consumption as compared to 30 seconds where draining is good. Shaking of the work will greatly increase the draining rate and even slight movement interferes with reproducibility of experimental results.

Figure 4.



A wire screen was checked for drag-in to determine the effect of small openings in holding back solution. Two experiments are given in Table No. 6. Reproducibility was fair. The drag-in is given in ml/sq ft of screen rather than per unit of surface. With a solution of low surface tension, such a screen will hold the solution.

A drag-out study for the basket of nails used for the data of Table No. 1 is given in Table No. 7. Fair reproducibility is expected for this case due to the random distribution of the nails and the many points to hold the solution. For less than 4 seconds the draining rate was very high.

AUTOMATIC RESPONSE

Table No. 1 indicates that an automatic controller would respond in a short period of time, even in a still tank. In order to explore this factor a two-gallon tank was used with the cell close to the bottom. The conductivity of the water was 330 micromhos and the controller was set at 880 with a sensitivity for on-off of 30 micromhos. Trisodium phosphate was added to bring the conductivity up to 880. This required 35.2 ml of solution containing 10½ oz/gal of anhydrous trisodium phosphate. The solution was then allowed to set until it was still and 2 ml of solution was added from a burette. The controller turned on in 65 seconds. Additions of 2 ml were then made every minute. The results are shown diagramatically in Figure No. 5. The same experiment was repeated with slow hand agitation. Finally the experiment was repeated with shape A of Figure No. 4 using a single dip. The results indicate that when the tank is at the control concentration that a small increase in concentration or relatively slow movement will activate the valve. The greater the agitation the more frequently the controller will turn on and off.

ACTIVITY OF RINSE

Figure No. 3 indicates that a very dilute rinse may be alternately alkaline and acidic. Even though no specific cases are known, it is quite possible that this could be a source of trouble. With a controlled rinse this situation can be avoided. Also it is a possibility that the controlled rinse can be used as a holding tank if the work will remain active in the rinse. With this in mind, a few simple experiments were tried with clean nails exposed to various dilute solutions.

Tables No. 8, 9 and 10 show the effects of trisodium phosphate, sulfuric acid and chromic acid. The conclusions were that iron would remain active in sulfuric acid solutions of 0.025 oz/gal or more and would rust at lower concentrations. Iron was apparently passive in trisodium phosphate of 0.1 oz/gal or in chromic acid of 0.1 to 0.2 oz/gal, depending on the holding time.

At low concentrations iron will rust or corrode in any of the solutions. This would indicate that iron rinse tanks could be kept free of rust with a properly controlled rinse and that the rinse would be suitable for a holding tank in many cases.

STAINING OF WORK

For a final rinse, staining of the work is often a factor. The most economic concentration based on water usage,

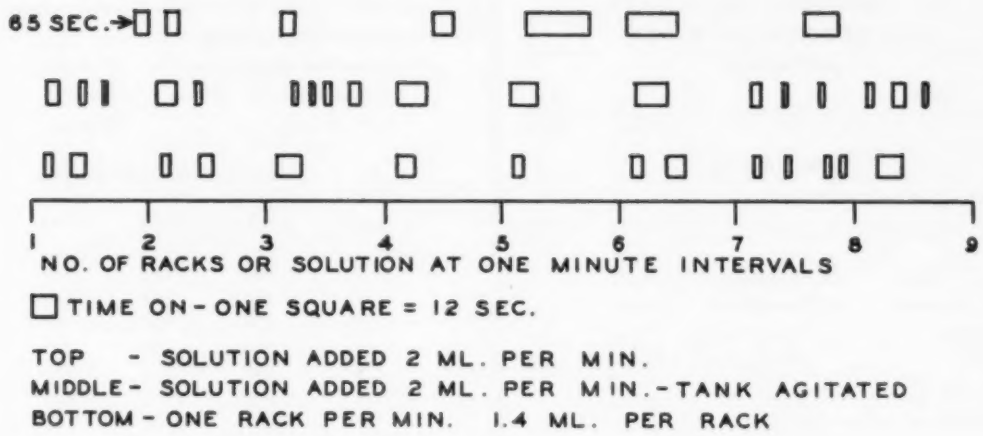

65 SEC.→
1 2 3 4 5 6 7 8 9
NO. OF RACKS OR SOLUTION AT ONE MINUTE INTERVALS
TIME ON - ONE SQUARE = 12 SEC.
TOP - SOLUTION ADDED 2 ML. PER MIN.
MIDDLE - SOLUTION ADDED 2 ML. PER MIN. - TANK AGITATED
BOTTOM - ONE RACK PER MIN. 1.4 ML. PER RACK

Figure 5.

rinse activity or other factors, may become unimportant where staining must be taken into account. A few experiments were carried out in order to obtain an indication of the range in which staining takes place.

Results for staining of 2 inch x 2 inch sheets of stainless steel with chromic acid solutions are shown in Table No. 11. The sheets were dipped in cold solutions and allowed to dry at the bottom horizontal edge. Staining is readily apparent at 0.05 oz/gal or more. However the stain could be readily removed by wiping in all cases.

Tin plated steel sheets were dipped in trisodium phosphate solutions, and it was difficult to detect any effect on drying, even at 0.4 oz/gal. Therefore 2 inch x 2 inch glass plates were dipped and allowed to hang so that the last part of the cold solution dried at a corner. At 0.2 oz/gal, the entire plate was cloudy, at 0.1 oz/gal, the bottom half was cloudy and below this a cloudy spot remained at the bottom corner.

Tables No. 13 and 14 show the appearance of a drop of chromic acid or trisodium phosphate dried on a clean glass plate and held against various backgrounds. It is obvious that the background and the type of solution will have a marked effect. Definite conclusions cannot be drawn, but the indications are that appearance may be the limiting factor in some cases, but not in all cases.

CONCLUSIONS

The most economic setting for a controlled rinse tank will be governed by the following factors:

1. Water cost.
2. Drag-in of chemicals to the next tank in line.
3. Activity of the rinse tank.
4. Spotting or staining of the work.
5. Waste treatment of the rinse water.

It is felt that 0.1 oz/gal is a good general starting point for a controlled rinse tank. The feasibility or desirability of a higher or lower concentration can be established by observation of the results at the plating line. By the use of the conductivity method, drag-out can be readily determined. Economic holding times and rinsing practices can also be readily established.

It is anticipated that controlled concentrations may range from 0.02 to 1.0 oz/gal. The controlled rinse tank and the conductivity method offer a means to accurately establish the most economic rinsing practice.

TABLE NO. 1

Work: 6 oz nails—0.80 sq ft

Tank: 9½ qts—Flow: none

Time Seconds	Conductivity Micromhos	NaCl oz/gal
0	2400	0.134
5	2400	0.134
15	2700	0.153
25	4300	0.256
45	3420	0.199
60	3900	0.230
90	3920	0.232
120	3780	0.223
150	3820	0.225
Agitate	2800	0.160

More Tables on Following Pages

THE FOLLOWING TABLES HAVE BEEN GROUPED FOR READY REFERENCE

TABLE NO. 2

Work: 6 oz nails—0.80 sq ft

Tank: 9½ qts—Flow: 9 oz/min

Time Seconds	Conductivity Micromhos	NaCl oz/gal
0	2420	0.135
10	3800	0.224
15	2780	0.158
30	2720	0.156
45	2620	0.148
60	2520	0.141
90	2420	0.135
120	2350	0.131
150	2330	0.129
Agitate	2360	0.132

TABLE NO. 3

Work: 6 oz nails—0.80 sq ft

Tank: 9½ qts—Flow: 9 oz/min

Time Seconds	Conductivity Micromhos	NaCl oz/gal
0	2370	0.132
5	2800	0.160
10	4080	0.242
20	2900	0.166
45	2270	0.146
60	2110	0.135
90	2070	0.133
120	1970	0.126
150	1890	0.121
Agitate	2070	0.133

TABLE NO. 4

Tank 9½ qt **Flow** 9 oz/min

Conductivity of water—310 Micromhos

Time Minutes	Conductivity Micromhos	NaCl oz/gal
Agitate	2380	0.133
0	2380	0.133
1	2260	0.125
2	2180	0.120
3	2080	0.114
4	1920	0.103
5	1770	0.94
Agitate	1700	0.89

TABLE NO. 5

Conductivity in Micromhos on addition of various solutions to one gallon of tap water.

Trisodium phosphate	22 oz/gal
Sodium Chloride	28 oz/gal
Sulfuric acid	10 oz/gal

Ml Added	Conductivity—Micromhos T.S.P.	NaCl	H_2SO_4
0	250	410	310
1	260	540	310
2	270	670	320
3	280	790	385
4	290	910	510
5	305	1010	660
6	325	1120	800
7	350	1270	920
8	375	1380	1050
9	415	1500	1180
10	455	1600	1310
15	665	2150	1950
20	895	2720	2480
25	1110	3310	3140

TABLE NO. 6

3 inch x 4 inch, 14 mesh copper screen.

Solution—NaCl 30 oz/gal

Water—310 Micromhos

Drain Time Seconds	Conductivity—Micromhos Read	Inc	Read	Inc	Av	Drag-in ml/sq ft of screen
1	470	160	820	140	150	35
2	550	80	880	60	70	16
4	580	30	930	50	40	9
8	605	25	960	30	30	7
15	640	35	990	30	35	8
30	655	15	1005	15	15	4
60	680	25	1015	10	20	5

TABLE NO. 7

Basket of nails, 6 oz bulk volume, total area 0.80 sq ft

Drain Time Seconds	Read	Inc	ml/sq ft
	940		
4	1320	380	9.1
8	1720	400	9.6
15	2080	360	8.6
30	2410	330	8.0
60	2700	290	7.0

TABLE NO. 8

Effect of dilute trisodium phosphate solutions on clean iron.

oz/gal	Appearance	
	4 hrs	24 hrs
0.4	bright	bright
0.2	bright	bright
0.1	bright	bright
0.05	corroded	rust
0.025	bright	corroded
0.012	bright	rust
water	rust	heavy rust

TABLE NO. 9

Effect of dilute sulfuric acid solutions on clean iron.

oz/gal	2 hrs	4 hrs	24 hrs
0.4	gas	gas	etched
0.2	gas	gas	etched
0.1	gas	gas	gas
0.05	gas	gas	gas
0.025	gas	gas	gas
0.012		bright	heavy rust
0.006		rust	heavy rust
0.003		bright	heavy rust
Water		rust	heavy rust

TABLE NO. 10

Effect of dilute chromic acid solutions on clean iron.

oz/gal	2 hrs	24 hrs	48 hrs
0.4	bright	bright	bright
0.2	bright	bright	bright
0.1	bright	bright	dark
0.05	rust spots	sl rust	rust spots
0.025	rust spots	rust	rust spots
0.012	rust spots	rust	rust spots

TABLE NO. 11

Staining of stainless steel by chromic acid solutions.

oz/gal	Appearance of bottom edge
0.4	dark stain
0.2	dark stain
0.1	medium stain
0.05	medium-light stain
0.025	light stain
0.012	very light stain

TABLE NO. 12

Staining of glass plates with trisodium phosphate solution.

oz/gal	Appearance
0.4	cloudy
0.2	cloudy
0.1	bottom half cloudy
0.05	spot
0.025	spot
0.012	spot

TABLE NO. 13

Appearance of drop of chromic acid solution on a clean glass plate—dried 24 hours.

oz./gal	White background	Blue background
0.4	dark brown	medium brown
0.2	dark brown ring	light brown
0.1	light brown ring	very light brown
0.05	very light brown ring	negligible
0.025	faint brown ring	negligible
0.012	negligible-white	negligible-white

TABLE NO. 14

Appearance of drop of trisodium phosphate solution on clean glass plate—dried 24 hours.

oz/gal	Transmitted light	White background	Blue background
0.4	clear spot	clear spot	negligible
0.2	clear spot	clear spot	negligible
0.1	cloudy	negligible	negligible
0.05	cloudy	negligible	slight
0.025	cloudy	negligible	light
0.012	cloudy	negligible	slight
water	cloudy	negligible	slight

REFERENCES

[1]Rinsing Techniques by Joseph B. Kushner, Metal Finishing Guidebook Directory, 1955 Edition, pg. 390.

[2]Rinsing by H. L. Pinkerton, Electroplating Engineering Handbook, Reinhold Publishing Corporation, 1955, pg. 589.

[3]G. F. Herrmann, F. J. Hendel and D. A. Marino, pub. 41st Annual Conv. Amer. Elect. Soc., N. Y., 1954, presented New York Branch A.E.S., N. Y., June 26, 1953.

[4]Nathaniel Hall, Metal Finishing, October 1954, pg. 51.

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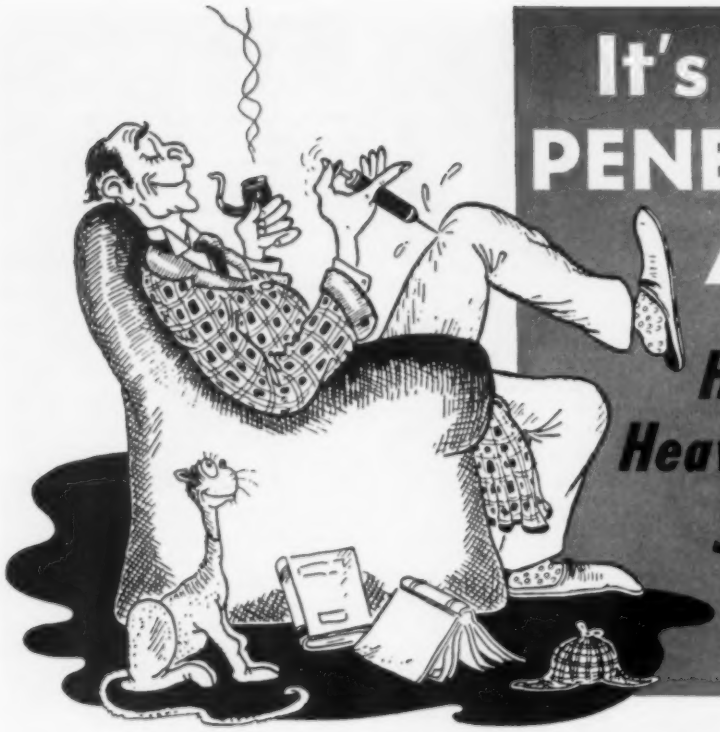

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TABLE NO. 8

Effect of dilute trisodium phosphate solutions on clean iron.

oz/gal	Appearance	
	4 hrs	24 hrs
0.4	bright	bright
0.2	bright	bright
0.1	bright	bright
0.05	corroded	rust
0.025	bright	corroded
0.012	bright	rust
water	rust	heavy rust

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0.05	cloudy	negligible	slight
0.025	cloudy	negligible	light
0.012	cloudy	negligible	slight
water	cloudy	negligible	slight

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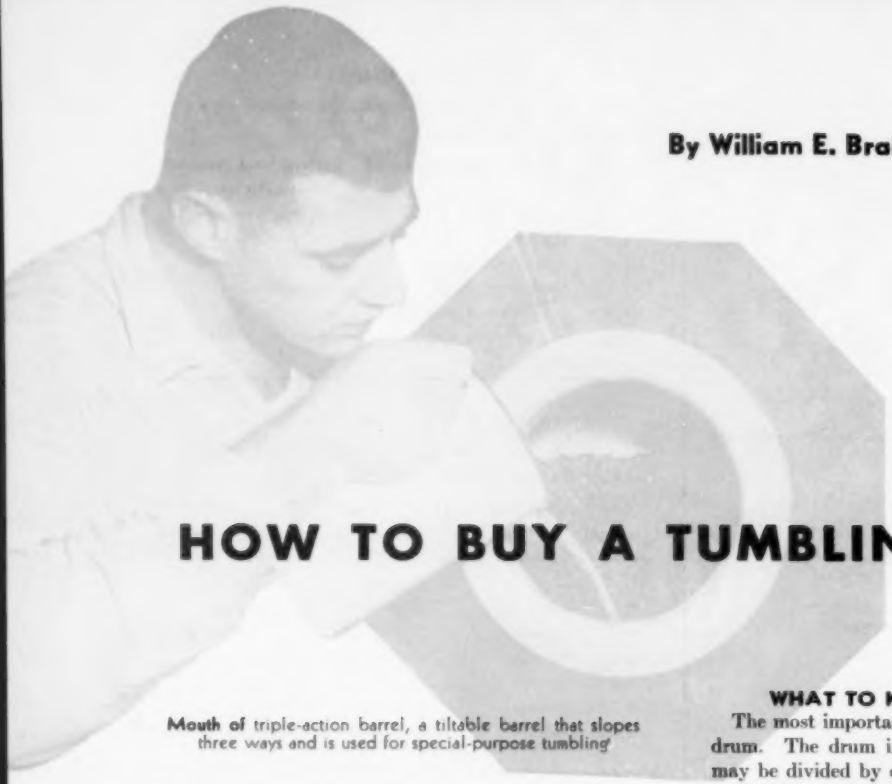
By William E. Brandt and David W. Stitely*

HOW TO BUY A TUMBLING BARREL



Mouth of triple-action barrel, a tiltable barrel that slopes three ways and is used for special-purpose tumbling

Before selecting a tumbling barrel, it is important to know what not to do. Here are four very reliable "dont's:"

Don't buy a barrel before you work out your specific process—you may be very sorry if you do. Develop the most satisfactory process first and then buy the barrel that is best suited to it.

Don't buy a barrel on the strength of a few satisfactorily tumbled samples. Insist upon at least one test run under actual production conditions in the type of barrel you think you wish to purchase.

Don't pick a boy to do a man's job. Even though a small barrel will do satisfactory work under production conditions, don't buy it until all factors have been taken into consideration. A factor that is very often neglected is the size of the production run. To turn out a large quantity of work, it may prove more economical to buy a single large barrel than a number of smaller ones.

Don't buy a barrel from an organization that is not equipped to give you service and technical advice on your particular problems.

For most shops, the most desirable tumbling barrel is not engineered for one particular task but is designed to do any type of work within its specified capacity. There are many different types of special-purpose barrels, tiltable cones, polygonal prism and pyramids, narrow-necked "bottles" and the like, but the only all-purpose barrel is horizontal. More horizontal barrels are sold than any other type, and a horizontal barrel will do every kind of work required in barrel finishing: degreasing, flash removal, deburring, abrasive cut down, non-abrasive cut down, formation of radii, finishing, burnishing and polishing.

*Lord Chemical Corp., York, Pa.

WHAT TO KNOW ABOUT THE DRUM

The most important element of a tumbling barrel is its drum. The drum interior may be a single chamber or may be divided by one or more partitions into compartments. The compartments are provided with watertight doors. Door-locking arrangements should be quick and positive, and the door must give a watertight seal without undue pressure on the locking clamps.

The shape of the drum is what provides the tumbling action. Let us see why this is so. Consider first an unlined round drum, of the type that should *not* be used for tumbling, and load it with parts and chips (abrasive media). The load, being quite heavy, will remain at the bottom. When the barrel is rotated, the curved surface simply slides beneath the load. No tumbling action! The round barrel could be run for an indefinite length of time, and the parts would receive no finishing.

To line the round drum will help some but not much. What is needed are flat surfaces that will lift up the load as the barrel turns. The lifting will continue until gravity takes over and slides the chips and parts back to the bottom. The next flat surface lifts them up again and so on. That's tumbling action. To get it, the useless cylindrical drum must be converted into a polygonal prism.

A regular polygon may have any number of sides, starting with three. Triangular and square barrels, though, will have to be ruled out: they lift the load too high, the drops are too great and the tumbling action, in consequence, is far too harsh. A hexagonal barrel, though much better, is still too rough when fine work is required. Let us add two more sides.

In an octagonal barrel, the action has been refined to the point where it is suitable for almost any type of work. The octagonal prism is the common shape for a horizontal tumbling barrel. Theoretically, a barrel having 12 or 16 sides would give still smoother action, but in practice horizontal barrels with more sides than eight are seldom necessary. Tumbling action may be refined by many

other methods than barrel shape. The height of the total load, the water level, the type of media, the size or sizes of chips and chip mixtures, the type of tumbling compound, the amount of compound—all of these variables constitute control factors that may be applied.

The drum must be built to withstand the stresses of starting and stopping. It must be sufficiently rigid not to deform when a high starting torque is applied to the drive end. Abrasive wear on the interior is another important consideration. Most wear will occur on the center of the end plates and on the center area of the dividing partition or partitions. End plates and partitions, therefore, should be of heavier construction than the sides. In an unlined drum, the partition should be twice as heavy as the end plates because the wear will occur on both sides. If this point is overlooked, as it is frequently, the result is short drum life.

An unlined drum must be of extra-heavy construction if it is to give proper service and have long life. It is usually preferable to line the drum with a replaceable liner to take the wear. The liner will serve another equally important purpose: it will cushion workpieces against contact with the sides and end of the barrels. The most common liner is Neoprene, a synthetic rubber that is resistant to both oil and abrasion. Neoprene linings are usually guaranteed for one year under normal usage. If a loading guard (a loose steel frame) is used when loading and unloading, danger of accidental damage to the Neoprene lining at the door will be greatly minimized.

A hub or hubs are welded or bolted to the end or ends of the drum to hold the shaft. The shaft is supported by bearings mounted upon a stationary framework. The barrel is usually rotated by a chain-and-sprocket drive. For operating flexibility, a variable-speed unit is needed, and this is customarily integrated with the electric motor. The essential controls provide forward and reverse speeds and also "jogging" to put the compartment or compartments into proper loading and unloading positions.

All of these elements—drum, shaft, bearings, chain and sprocket, motor and electrical controls—must be carefully weighed and separately considered. Though the horizontal all-purpose tumbling barrel is a comparatively simple mechanism, its selection entails problems that are anything but simple.

WATCH THIS CHECK LIST

Here are six questions that should be answered before you place your order:

1. What is the nature of the work to be processed? Dimensions, weight and contour of the individual pieces will all have bearing on the barrel needed for tumbling.

2. How many pieces must be processed during a work shift? The answer to this question will determine not only the barrel size, but also the number of barrels to be ordered.

3. What is the time cycle of the tumbling operation?

4. What are the best media and the most suitable compounds to be employed? Media, in particular, will affect the drum construction needed. This is worth explaining.

Granite chips, beach pebbles and other natural media weigh in the neighborhood of 80 pounds per cubic foot; fused aluminum-oxide chips weigh about 130 pounds per cubic foot. A lightweight barrel, wholly satisfactory for natural media, may develop operating troubles when a shift is made to aluminum-oxide chips. Still less will the light barrel be usable with steel slugs, shot, burnishing balls or the lead pellets that are sometimes used in the processing of bearings.

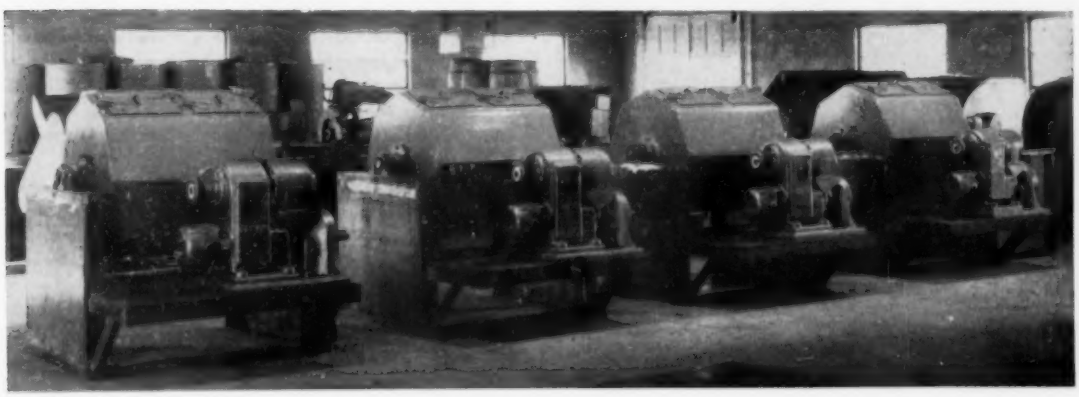
Since fused aluminum-oxide chips are now employed almost universally, drums should be designed to take into account the heavier weight of the load.

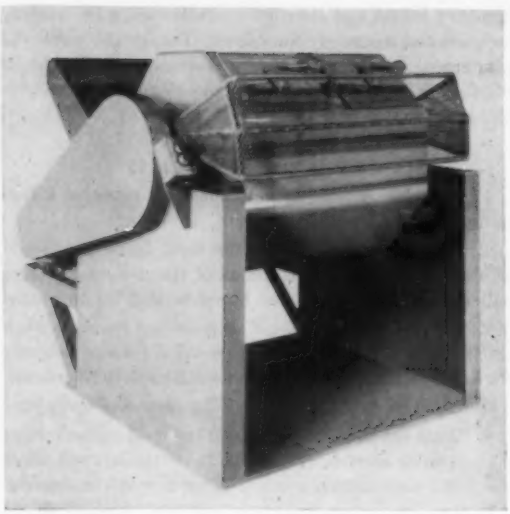
5. What is the proper water level? The weight of the water should also be taken into account. It is not negligible—water weighs 62.3 pounds per cubic foot. A high water level may add a great deal to the load the barrel has to turn.

6. What is the best speed range for practical operation? There is a very definite relation between motor horsepower and operating speed. Since much tumbling is done at very slow speeds, rugged construction of the drive unit is required to withstand the high torque.

The answers to the above questions are sometimes furnished by past experience. More often they must be

Four Model 332's under construction at Lord Chemical Corp. Drums are 30 in. in diameter by 32 in. long





Screen guard is provided with an electrical interlock that keeps barrel from turning while the guard is in the raised position for loading or unloading. Note metal housing for chain and sprocket at left

Deluges such as this explain why motor and control units must be kept off the floor

obtained the hard way by experimentation and trial-and-error processing. If you do not have a tumbling barrel you can use for this purpose, the experimenting should be done at the barrel manufacturer's plant. He will be happy to work with you in recommending suitable equipment.

SIZE, SPEED AND HORSEPOWER

Tumbling barrels are built in widely varied sizes. In our shop, we have a tiny barrel, used for the finishing of such products as surgical needles. This barrel is only 6 inches in diameter by 3 inches wide. We also have a barrel 67 inches long with a capacity of 72.4 cubic feet. Theoretically, custom-built barrels can be made any size although economic considerations and construction problems will impose practical limitations.

The volume of an octagonal tumbling barrel may be computed from the formula:

$0.828\ D^2L$, where D = distance across flats
L = inside length of drum

Motor horsepower is correspondingly extended over a wide range.

As a rough guide to motor selection, the following may be helpful:

Drum Capacity	*Horsepower*
Up to 6 cu ft	1
Up to 12 cu ft	2
Up to 18 cu ft	3
Up to 30 cu ft	5
Up to 45 cu ft	7½

These recommendations are based upon a top speed of 24 rpm with the drum 75 per cent loaded. As so high a speed is rarely used for tumbling, a reserve of power is present to assure longer and more trouble-free life.

Speed ranges vary with barrel size; the smaller the barrel, the greater the number of revolutions per minute at which it may be operated.

SHAFT, BEARING, FRAMEWORK

Let us now take a quick look at the other components of a tumbling barrel: shaft, bearings, framework, chain and sprocket, drive unit, controls, safety devices.

Shafts should be sufficiently large not to deflect under the weight of the loaded drum and the starting torque of the drive. Hence both factors must be known before the shaft size is specified. Bearing size is, of course, determined by shaft size, but a bearing must be chosen that will give long life under the loads to be encountered. An expansion-type bearing should be used on the idling end as the tumbling action always generates heat, which may cause the drum to expand to a slight extent.

Shaft bearings may be either outboard or inboard. With inboard bearings, the tumbling compartment is at an extremity of the shaft, or else two compartments are placed to balance each other at opposite ends of the shaft. The shaft deflection will be greater than with outboard bearings, which permit the compartment or compartments to be located at the center of the shaft.

The framework that holds the shaft bearings may be built of solid plate or be of open construction. The frame

must be strong enough to hold the combined weight of the drum, its top load and the drive units; it must also be sufficiently rigid to suppress vibration. The most rigid as well as the strongest frame is one with a base. Omission of the base plate is not recommended where stable construction is desired. Bolting the frame to the floor will usually aid in keeping vibration and frame movement to a minimum.

Chain and sprocket are chosen to give the proper reduction and output speeds, keeping in mind manufacturers' recommendations. Usually, a chain of ¾-inch pitch is good up to 1 hp; a 1-inch pitch up to 3 hp; a 1¼-inch pitch up to 5 hp; and a 1½-inch pitch up to 7½ hp. To insure long chain life, the size of the smaller drive sprocket must be carefully considered. The minimum number of teeth in the small sprocket should be from 15 to 19. To protect workers, the chain and sprocket should be enclosed by a metal housing.

MOTOR AND DRIVE UNITS

Placement of the drive unit is of considerable importance. Since the floor of a tumbling department is often wet, the integrated motor and drive units should be mounted on a raised platform above the floor. They must be where they will not interfere with the loading or unloading of the barrel. They should also be mounted to provide for adjustment to take up slack in the chain as slack develops under continued use.

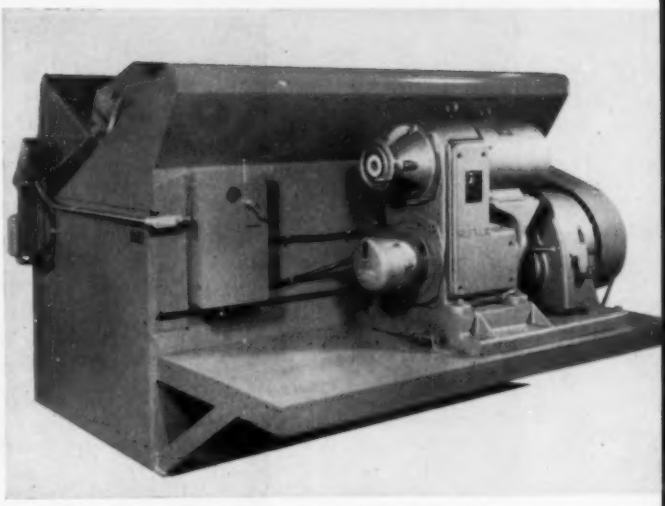
The motor and variable-speed units installed on tumbling barrels are of the enclosed type and moistureproof. Additional protection against even a deluge of water may be easily provided by a splash guard above the mounting platform. The motor and drive unit will be freer from continued splashing and also out of the way if they are located at the rear of the barrel. Ease of maintenance, however, must also be considered. All lubrication points, oil-level gauges, drain cocks, etc. should be in readily accessible spots. The motor should include an across-the-line magnetic starter, with overcurrent and undercurrent protection.

Electrical relays and switches should likewise be readily accessible and should be enclosed within a watertight box. Electrical controls are chosen according to the size of the motor. It is advisable that the voltage at the switches be limited to 110 volts to protect operators. A recessed control panel will make it difficult for an operator to brush accidentally against a switch.

PROVISIONS FOR SAFETY

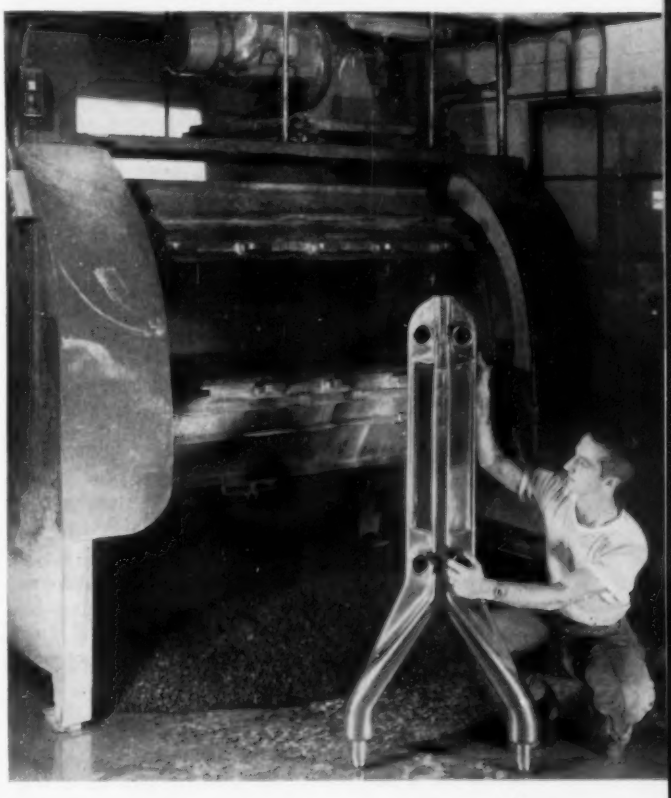
Modern tumbling barrels are equipped with built-in safety devices to protect operators and other plant personnel. Screen guards, for example, are provided with an electrical interlock that will keep the barrel from turning while the guard is in the raised position for loading or unloading.

After a power failure, the drum should be restarted as soon as possible to resume the work cycle. But suppose, as may well be likely, that there is no one around to push the start button? It is advisable to use a continuous contact switch, which will operate when line voltage reaches the pick-up voltage of the magnetic starter. With such a



Rear view of integrated motor and variable-speed units mounted on a raised platform. Electrical relays and switches are in the waterproof box at left

Measuring 67 in. long and 47½ in. from flat to flat (capacity of 72.4 cu ft), this barrel is used at Lord Chemical Corp. for tumbling such large parts as this section of a stainless-steel heat exchanger frame



Operator Bernie Jagodzinsici unloads a ½-cu-ft barrel at The Martin Co., Baltimore. Though designed for bench work, this little barrel has been column-mounted for greater convenience

device on duty to restart the drum, the danger of a barrel load of workpieces being ruined by a power failure is greatly lessened.

A timer is essential if runs are to be continued after working hours. We recommend a timer of the 24-hour type, built for 110-volt operation. Such a timer will turn off the drum when the cycle ends, even though it may be late at night and no workers present.

Yes, the selection of a tumbling barrel is anything but simple. However, a barrel well chosen for its job will last a long time and will require little maintenance. At least once a day SAE 40 oil should be brushed on the chain. Lubrication of other moving parts, however, is on a weekly schedule.

BARRELS FOR SPECIAL PURPOSES

All that has been said so far applies only to the selection of the common horizontal tumbling barrel. If you are thinking of buying a special-purpose barrel, better get an expert to offer specific advice. These barrels are usually of the oblique tilting type, adjustable over a range from horizontal to vertical. Instead of an octagonal prism, the drum may be a truncated cone, a polygonal pyramid, an open-mouthed bottle or an even more complex shape. Barrels built for special jobs may have six, eight, twelve or even more sides.

Tiltable barrels are usually limited in scope but will do well the particular job for which they are designed. An excellent example is the "triple-action" barrel, which slopes three ways and will provide three simultaneous slides of chips and workpieces instead of the single slide given by the all-purpose barrel. The triple-action barrel will often debur twice as fast as a horizontal barrel but cannot very well be used for burnishing or fine finishing.

To summarize, the most important element of the tumbling barrel is its drum. The drum of the horizontal all-purpose barrel must be big enough and sturdy enough for the job it has to do. All other components of the barrel—shaft, bearings, framework, chain and sprocket, motor and drive units and electrical controls—must be selected to match the drum.

William E. Brandt, vice-president, Lord Chemical Corp., of York, Pa., was born in Rinteln, northern Germany, in 1905 and came to the United States at the age of 19.

After graduation from the U. of Chattanooga in 1928, Brandt went ahead with his original plan of preparing for the ministry. He spent three years at the Lutheran Theological Seminary, Philadelphia. In all he gave some 15 years of service in the ministry.

From the ministry he went to Rohm & Haas, Philadelphia, as development engineer.

In 1952 he left R&H and founded Lord Chemical Corp. During its first year, the new company did a $45,000 business. In 1953, fresh capital came from H. R. Stitely, of the Liberty Machine Co., York, Pa. With Stitely as president and Brandt as vice-president, the new Lord Chemical Corp. put up a modern plant on the outskirts of York.

David W. Stitely, design engineer, Lord Chemical Corp., was born in 1925 at Petrolia, Pa. After two years in the United States Navy, 1944–1946, he entered Pennsylvania State University, graduating in 1949 with a BS in electrical engineering. He worked as a field engineer on radar installations for National Scientific Laboratories, Washington, D. C., and later as an associate engineer with Johns Hopkins Applied Physics Laboratory, Silver Springs, Md. In April, 1954, he joined Lord Chemical Corp. and Liberty Machine Co., York. He is vice-president and chief engineer of Liberty Machine.

ANALYTICAL DETERMINATION OF TRACE CONSTITUENTS IN METAL FINISHING EFFLUENTS

XV. The Colorimetric Determination of Cyanates in Effluents

By D. G. GARDNER,* R. F. MURACA† and E. J. SERFASS‡

THE FOLLOWING PAPER, THE FIFTEENTH OF A SERIES, IS A RESULT OF THE WORK SPONSORED AT LEHIGH UNIVERSITY BY THE AES AND THE OHIO RIVER VALLEY WATER SANITATION COMMISSION. WHILE THE ORIGINAL PROCEDURE WAS WORKED OUT UNDER AES SPONSORSHIP, THE MODIFICATION WAS DEVELOPED UNDER ORSANCO SPONSORSHIP, THE COMMISSION HAVING PLACED THE PROJECT AT LEHIGH SO AS TO BE ABLE TO UTILIZE THE BACKGROUND DEVELOPED BY AES PROJECT NO. 2. IT SHOULD BE NOTED THAT THE METHODS DESCRIBED IN THIS SERIES WERE TESTED, MODIFIED IF NECESSARY, AND RETESTED BY AT LEAST SIX AND SOMETIMES AS MANY AS TWELVE INDUSTRIAL LABORATORIES. AS A RESULT OF THIS, THE APPROVED FORM, AS PUBLISHED HERE, WAS DEVELOPED.

ABSTRACT

A colorimetric procedure for the determination of the cyanate content of effluents in the range of 5 to 50 ppm is presented. The method was found to give satisfactory results in the presence of 100 ppm of each of 23 elements and ammonium, cyanide, and thiocyanate ions in simultaneous admixture.

In this method, the ammonia formed by the acid hydrolysis of cyanate is distilled off and collected. Nessler's solution is then added to the distillate and the intensity of the yellow-orange color which is formed is measured with a colorimeter.

The procedure can be shortened if the content of each substance other than cyanate is below 1 ppm. A table summarizes the ways in which the procedure can be shortened when the amounts of the materials other than cyanate are known or can be estimated.

THE COLORIMETRIC DETERMINATION OF CYANATES IN EFFLUENTS

This method for the determination of micro-quantities of cyanate involves the hydrolysis of the cyanate ion to ammonia and the subsequent determination of the ammonia by Nessler's reagent. A survey of the literature revealed no specific organic reagent suitable for the direct colorimetric determination of cyanate.

The hydrolysis of cyanate to ammonia was proposed as a procedure for cyanate analysis by Herting.[1] Leboucq[2] showed that the acid hydrolysis of cyanate was quantitative and that the determination of the resulting ammonia could be used to indicate the amount of cyanate.

Kleppinger,[3] Serfass, et al[4] have shown that micro-quantities of cyanate can be estimated by hydrolyzing the cyanate and determining the ammonia by means of Nessler's reagent. The proposed method is an adaptation of Kleppinger's and Serfass' determination of cyanates in cyanide baths.

DESCRIPTION OF METHOD

The ammonium salts already present in the sample are removed by boiling with excess alkali hydroxide in the presence of alkali sulfide. It has been found that prolonged boiling of cyanates in the presence of excess alkali does not cause appreciable hydrolysis or loss when carried out under the conditions prescribed in this procedure. The solution is then acidulated and boiled again to cause hydrolysis of the cyanate to ammonium salts to remove cyanides, nitrites, sulfites, sulfides, etc.

The ammonium salts resulting from this hydrolysis are transferred to a Kjeldahl distillation apparatus together with a large excess of sodium hydroxide containing sodium sulfide. The liberated ammonia is collected in dilute acid and the amount of ammonia present in the distillate is determined by Nessler's reagent either with a colorimeter (turbidimeter) or by optical comparison in Nessler tubes in accordance with well-established procedures.

The acidity of the solution in which the hydrolysis of the cyanate is being carried out must be carefully controlled since a high concentration of acid, which may result from concentration by prolonged boiling, will promote the hydrolysis of small quantities of residual cyanide to ammonium formate. The volume of solution prior to the addition of the Nessler's reagent has an effect on the final color; therefore, the volumes indicated in the procedure must be observed. Sodium sulfide is added during the boiling with alkali in order to insure the complete release of ammonia from metallic-ammonia complexes such as the cobalt amines.

SENSITIVITY OF THE METHOD

The sensitivity of the method is defined as the number of micrograms of cyanate ion which must be determined with a relative error of ± 50 per cent. For the following recommended procedure, this corresponds to 5 ppm or 500 micrograms of cyanate in the 100 ml sample taken.

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LIMIT OF DETECTION OF THE METHOD

The limit of detection of the method is defined as the number of micrograms of cyanate ion which must be present in the 100 ml sample taken for analysis so that an extinction of 0.005 will be obtained in Step 8 for a 1 cm cell thickness at 400 millimicrons. For the recommended procedure, the limit of detection is 100 micrograms of cyanate ion (1 ppm).

DISCUSSION OF THE BLANK

A blank is used to compensate for the presence of traces of cyanate or ammonia in the reagents.

DISCUSSION OF THE SAMPLE

If the sample is alkaline, it may be stored for short periods of time without deterioration, that is, without loss of cyanate due to hydrolysis. If the sample is acid or neutral, the hydrolysis of the cyanate is in progress and consequently the sample immediately must be made alkaline for storage.

Since the recommended procedure does not involve a step for the removal of organic matter which may react with or liberate cyanates in alkaline or acid medium, the presence of such organic substances will invalidate the analysis. The determination will not be applicable to those samples containing organic materials which liberate ammonia on acid hydrolysis or hydrolyze to form compounds in basic medium which will subsequently yield ammonia on acid hydrolysis.

The presence of oxidizers in the effluent must be taken into consideration since it is conceivable that cyanides may be oxidized to cyanates in basic medium; oxidation in acid medium is not likely to occur because HCN is evolved. Powerful reducing agents also should be absent since cyanate can well be reduced to cyanide. An example of this is afforded by stannous ion which will reduce cyanate in basic but not in acidic solution.

During the investigation of this method, it was found that commercial "cp" alkali cyanides contain cyanates, and this must be taken into consideration when the method is used.

RECOMMENDED PROCEDURE

This procedure is designed to be used for the determination of 5 to 50 ppm of cyanate ion in a 100 ml sample of effluent.

REAGENTS REQUIRED

(1) **Sodium Hydroxide-Sodium Sulfide Solution:** Saturate 250 ml of 25 per cent w/v NaOH solution with H_2S gas. Mix this solution with 750 ml of 25 per cent w/v NaOH solution.

(2) **Sulfuric Acid Solution:** 1:4.

(3) **Hydrochloric Acid Solution:** Approximately N/10.

(4) **Gum Arabic Solution:** 2 per cent w/v.

(5) **Nessler's Solution:** Dissolve 50 g of potassium iodide in approximately 35 ml of cold ammonia-free water. Slowly add a saturated solution of mercuric chloride until the first slight precipitate of red mercuric iodide persists, and then add 400 ml of a clarified 9 *N* solution of sodium hydroxide. Dilute the solution to one liter with ammonia-free water and allow it to settle. Siphon off the clear supernatant liquid.

(6) **Standard Ammonia Solution:** Dissolve 0.787 g of pure, dry, ammonium sulfate in water and dilute to one liter.

$$1 \text{ ml} = 215 \text{ micrograms of } NH_4^+$$
$$= 500 \text{ micrograms of cyanate}$$
$$2H_2O + CNO^- = NH_4^+ + CO_3^-$$

In establishing a calibration curve, 1 ml of this solution used in Step 3 corresponds to 5 ppm of cyanate in a 100 ml sample of effluent taken for analysis in Step 1 of the recommended procedure.

SPECIAL EQUIPMENT

(1) Kjeldahl distillation equipment with 300 ml flasks.

RECOMMENDED PROCEDURE FOR THE DETERMINATION OF CYANATES

(1) Pipette a 100 ml sample of the oil-free effluent into a 250 ml beaker.
In running a blank or establishing a calibration curve, use 100 ml of water.
If the effluent is strongly acid, cautiously neutralize it with dilute sodium hydroxide solution.

(2) Add 5 ml of sodium hydroxide-sodium sulfide solution. Bring to a vigorous boil, and continue the boiling for one half hour. Do not allow the volume of the solution to drop below 75 ml; add water when necessary.

(3) Cool the solution in the beaker, and neutralize with 1:4 sulfuric acid, using phenolphthalein or another indicator to approach the neutral point.
Add 5 ml of 1:4 sulfuric acid in excess of the neutral point. (Note: Too large an excess of sulfuric acid will cause the hydrolysis of cyanides to ammonia).
In establishing a calibration curve, 1 ml of the standard ammonia solution added at this point corresponds to 5 ppm of cyanate ion in the 100 ml sample used in Step 1.
Bring to a brisk boil and continue boiling for one half hour.
Do not allow the volume of the solution to fall below 75 ml; add water when necessary.

(4) Cool and transfer to the Kjeldahl distilling flask. Set a 125 ml Erlenmeyer flask containing 20 ml of 0.1 N HCl so as to receive the distillate. Be sure that the end of the condenser dips well under the acid in the flask.

Add 20 ml of the sodium hydroxide-sodium sulfide solution and immediately connect the flask to the distilling apparatus. Then, shake the flask so as to mix the contents very well.
Collect between 50 and 60 ml of distillate in the acid solution.

(5) Transfer the distillate to a 100 ml volumetric flask and dilute to the mark.

(6) Pipette 10 ml of this solution into a 100 ml volumetric flask.
Add 3 drops of a 2 per cent gum arabic solution; swirl the contents of the flask.
Add 1 ml of Nessler's reagent and mix well.
Dilute up to the mark with water, shake well and wait 5 minutes.

(7) Set the colorimeter to zero with water using a blue (No. 42) filter. With a spectro-photometer, set the instrument to full scale with water at about 400 millimicrons.
The intensity of the developed color (turbidity) can be estimated by comparing the sample against Nessler's standards.

(8) Transfer the solution from step (6) to the sample cuvette and read the colorimeter.

(9) If necessary, convert the scale readings of the photometer to optical density. Subtract the blank reading from the sample readings. If a calibration curve is being established, plot these corrected readings versus ppm of cyanate ion. If a sample is being run, read the amount of cyanate ion from the calibration curve.

VARIATIONS OF THE RECOMMENDED PROCEDURE

If the composition of the effluent is known, the recommended procedure for cyanate ion can be materially shortened.

The following table summarizes the changes that can be made in the recommended procedure for cyanate ion when the composition of the sample is known. Unless otherwise stated, the concentration of other elements must not exceed 100 ppm. For effluents containing greater quantities of these elements, dilution will be necessary. The effluent should be between pH 2 and 9. The use of Rochelle Salts to prevent precipitation of hydroxides was recently proposed by Dodge and Zabban.[5]

Composition of Effluent	Changes in the Recommended Procedure for the Determination of Cyanates
Ammonium salts below 2 ppm; this includes ammonia bound in complexes.	Omit step 2.
Colorless sample and all elements below 5 ppm each.	Pipette a 100 ml sample of effluent into a 250 ml beaker. Add 20 ml of 0.1 *N* HCl. Boil for 15 minutes, but do not let the volume fall below about 70 ml. Add water when necessary. Cool to room temperature, add 1 g of Rochelle Salts, and transfer to a 100 ml volumetric flask. Dilute to the mark, shake, and start with step 6 of the recommended procedure.
Silver, lead, bismuth, copper, cadmium, antimony, tin, iron, chromium, manganese, cobalt, nickel, and ammonia below 10 ppm each.	Pipette a 100 ml sample of effluent into a 250 ml beaker. Add 20 ml of 0.1 *N* HCl. Boil for 15 minutes, but do not let the volume fall below about 70 ml. Add water when necessary. Cool to room temperature, add 1 g of Rochelle Salts, and transfer to a 100 ml volumetric flask. Dilute to the mark, shake, and start with step 6 of the recommended procedure.
Cyanides over 100 ppm; alkali metals, alkaline earths, zinc, and aluminum below 100 ppm each; all other elements below 10 ppm each.	Pipette a 100 ml sample of effluent into a 250 ml beaker. Add 20 ml of 0.1 *N* HCl. Boil for 15 minutes, but do not let the volume fall below about 70 ml. Add water when necessary. Cool to room temperature, add 1 g Rochelle Salts, and transfer to a 100 ml volumetric flask. Dilute up to the mark, shake, and start with step 6 of the recommended procedure.
Ammonia over 100 ppm; all other elements below 100 ppm each.	Follow the recommended procedure.
Ammonia over 100 ppm; cyanide over 100 ppm; all other elements below 100 ppm each.	Follow the recommended procedure.

Composition of Effluent	Changes in the Recommended Procedure for the Determination of Cyanates
Alkali metals and alkaline earths below 100 ppm each; all other elements below 10 ppm each; cyanide and ammonia below 1 ppm each; pH 5–9.	Pipette a 100 ml sample of effluent into a 250 ml beaker. Add 20 ml of 0.1 *N* HCl. Boil for 15 minutes, but do not let the volume fall below 70 ml. Add water when necessary. Cool to room temperature and transfer to a 100 ml volumetric flask. Add 1 g Rochelle Salts; dilute to the mark, shake, and start with step 6 of the recommended procedure.

A SHORTENED PROCEDURE FOR 0.1 TO 5 PPM CYANATE

The shortened scheme of analysis presented below is designed for the determination of cyanates in water samples where the concentration of all substances and especially ammonia, is about the same as the cyanate content.

The sample should be adjusted to a pH of 2 to 9. Do not omit blanks.

Composition of the Effluent	Shortened Procedure
Cyanate 0.1 to 1 ppm	Take a 500 ml sample of the effluent and put into a 1000 ml beaker. Add 20 ml of concecrated HCl. Boil for 30 minutes but do not allow volume to fall below 250 ml. Transfer to a Kjeldahl flask and start at step 4. Omit step 5. Nearly neutralize the distillate using litmus paper. Add 3 drops of 2 per cent gum arabic solution and 1 ml of Nessler's reagent. Dilute to 100 ml; wait 5 minutes. Continue with step 7.
Cyanate 1 to 5 ppm	Pipette a 100 ml sample of the effluent into a 250 ml beaker. Add 20 ml of 0.1 *N* HCl. Boil for 15 minutes, but do not let the volume fall below about 70 ml. Add water when necessary. Cool to room temperature, add 1 g of Rochelle Salts, and transfer to a 100 ml volumetric flask. Dilute to the mark. Start with step 6 of the procedure, but use a 50 ml aliquot and add 3–5 ml of Nessler's reagent.

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Donald G. Gardner was born in London, England in 1924. He received the degree of A.B. in chemistry from Princeton University in 1948. Before graduating he spent two and one half years in the Army with service in the Corps of Engineers in the ETO. He was employed at the Lederle Laboratories of the American Cyanamid Company as an analytical chemist before entering Lehigh University where he received the degree of M.S. in chemistry in 1952. At Lehigh he served as a research assistant on the Ohio River Valley Water Sanitation Commission project. He is currently employed at the General Laboratories of the United States Rubber Company in Passaic, N. J., as an analytical chemist.

Dr. Earl J. Serfass, a recognized authority in the fields of chemistry, electrochemistry and metallurgy, served two consecutive terms as chairman of the important AES Research Committee. He is presently compiling for the AES a "Process Control Handbook." Recently he worked in cooperation with the Ohio River Valley Sanitation Commission which has just released a book on "Procedures for Analyzing Metal-Finishing Wastes," incorporating the results of AES project 2 at Lehigh University.

Dr. Ralph F. Muraca has been a regular contributor to Plating. He was an assistant professor in the department of chemistry at Lehigh University until August 1, 1955 and was more recently associated with an AES committee which studied the style and format of Plating. Dr. Muraca worked in cooperation with the ORSANCO committee on metal finishing wastes which recently published the book on "Procedures for Analyzing Metal-Finishing Wastes." This report incorporates results of AES Project 2 at Lehigh University with which he was also associated. Dr. Muraca is presently group leader, Analytical Chemistry Department, Jet Propulsion Labs at California Institute of Technology (Div. of Cal. Tech.).

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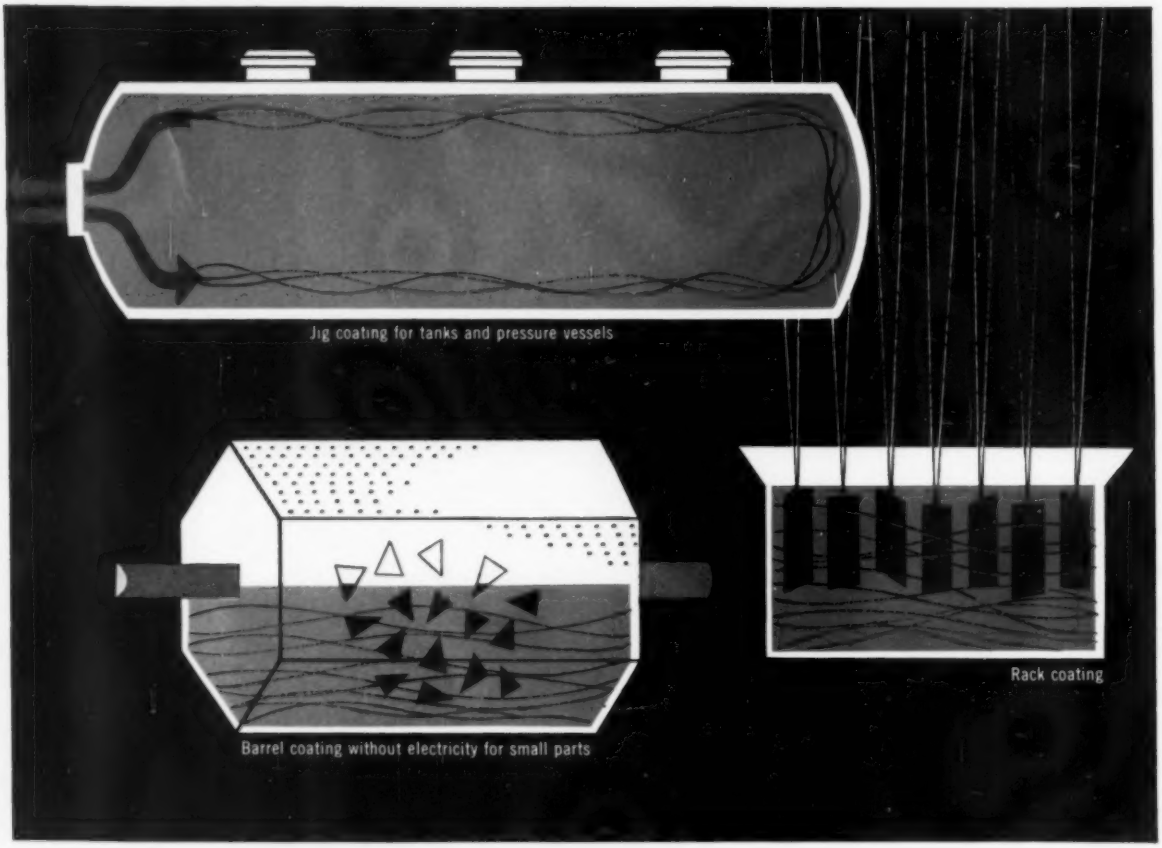

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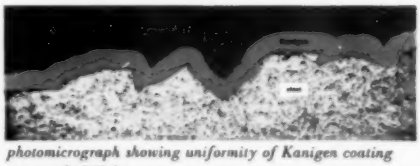

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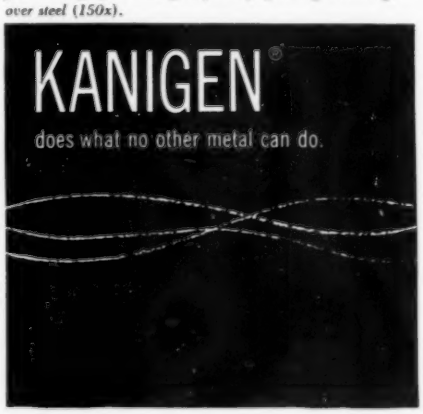

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COMPLEXOMETRIC DETERMINATION OF COPPER IN COPPER CYANIDE-ROCHELLE SALTS PLATING BATHS

By CLARENCE E. GEHRAND*

The determination of copper is usually accomplished by the iodometric or electrolytic methods.

Amin[1] made direct complexometric determinations of copper in alloys. This suggested the possibility of ascertaining the amount of copper in cuprous cyanide-rochelle salt plating bath by a complexometric titration.

The procedure as outlined below makes use of disodium dihydrogen ethylenediaminetetracetate dihydrate, using murexide as an indicator. Amin[1]: The precipitation of the copper as a sulfide with thioacetamide may be eliminated.[1, 4]

REAGENTS USED

1. EDTA solution 0.05 molar.
   18.61 grams of reagent grade of disodium dihydrogen ethylenediaminetetracetate dihydrate dissolved in exactly one liter of distilled water. (One ml = 3179. micrograms of copper.)
2. Buffer solution.
   Dissolve 26.8 grams of ammonium chloride and 176 ml of concentrated ammonium hydroxide in 500 ml of distilled water.
3. Murexide indicator powder.
4. Hydrochloric and nitric acids.

DETERMINATION OF COPPER

1. 10 ml of copper-cyanide plating solution are placed in 100 ml volumetric flask and diluted to the mark—100 ml.
2. 10 ml sample of the thoroughly mixed copper-cyanide solution are placed in a 250 ml beaker (1 ml plating solution).
3. Warm under the hood; slowly add hydrochloric acid until the solution is clear; evaporate to dryness and cool. Alternatively, warm under the hood and slowly add nitric acid; then evaporate nearly to dryness and allow to cool.[1]
4. Add approximately 50 ml of distilled water and stir until all salts are dissolved.
5. Add buffer solution dropwise until a blue color appears; then add a few drops in excess. Any iron which precipitates may be filtered off if desirable.[3]
6. Transfer the solution into a 500 ml Ehrlenmeyer flask, rinsing the beaker thoroughly with distilled water and make up to 250 ml with distilled water.
7. Add 2 to 3 mg of murexide indicator powder and agitate until in solution; the color should be yellow to yellow-brown.
8. Titrate with 0.05 molar EDTA solution until the yellow or yellow-brown color changes to an orange-red and then to a permanent purple-red color.
9. Mls of 0.05 molar EDTA solution x .4244 equals ounces per gallon of copper.

RESULTS OF COPPER ANALYSIS

A synthetic copper-cyanide plating solution was made with a known copper content, using cuprous cyanide and sodium cyanide, reagent grade, with addition of Rochelle salts.

Known Copper Present	Copper Found oz/gal of Solution		
4 oz/gal of solution	3.947	4.032	3.989

PRODUCTION PLATING SOLUTION

EDTA Method oz/gal of Copper			Iodometric Method oz/gal of Copper
5.645	5.602	5.559	5.525

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C. E. Gehrand, since 1921 has been engaged in chemical research in connection with the manufacturing industry. He has compiled 31 years experience in the industrial field, handling complex finishing problems, evaluation of mercury cleaning procedures and a host of associated problems.

Gehrand obtained his BS degree in chemistry from Beloit College, Beloit, Wis. in 1911, and was an instructor in science and mathematics at Munsing High School, Munsing, Mich. 1911 to 1912. He has been associated with the Milwaukee Coke and Gas Company as assistant laboratory manager and research chemist from 1912 to 1921. Since 1933, he has been associated with the Adams & Westlake Company of Elkhart, Indiana.

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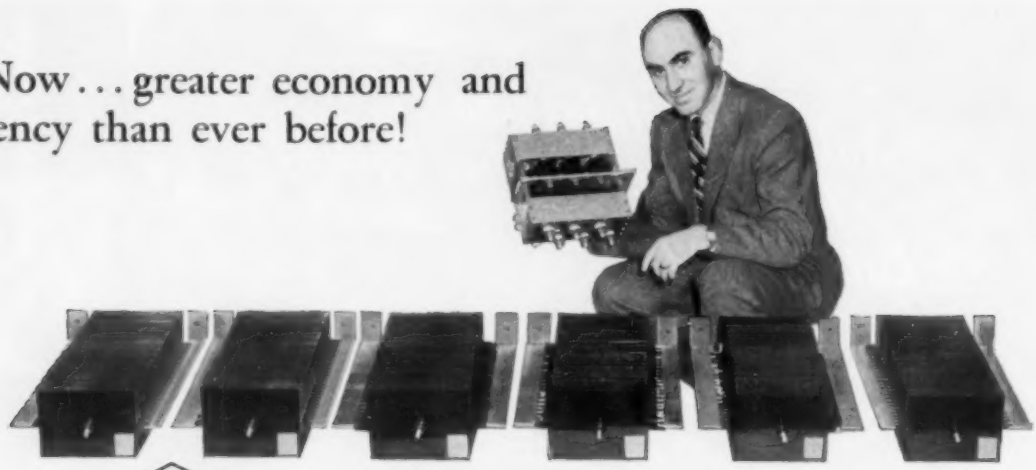

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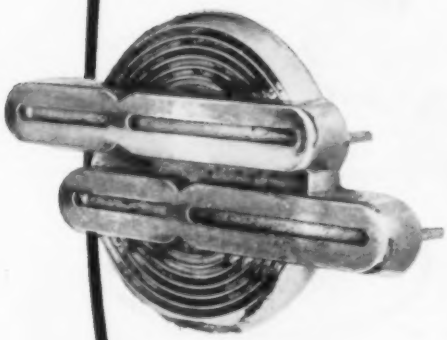
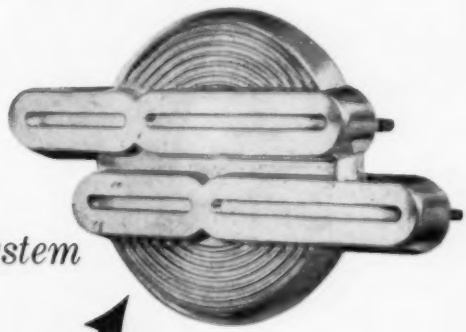
SAVES TIME — Cleaning action takes only 30 seconds to 5 minutes, depending on type of compound. Fast enough to be easily adapted to automatic or manual plating cycles. Eliminates vapor degreasing. It's non-toxic, odorless, and has excellent life.

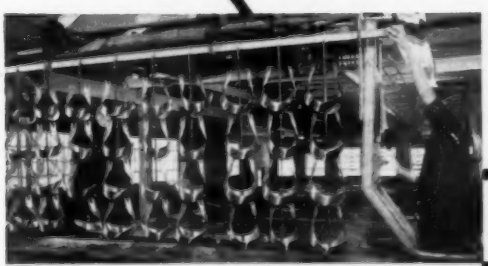


BEFORE cleaning, parts are covered with buffing compounds, especially buff lap. In some spots, hard-to-get-at recesses have been almost completely filled with buffing compound.

**using* HAVASOL O/SC-1 *system*



AFTER only 30 seconds to 5 minutes exposure to HAVASOL O/SC-1 System, all buffing compounds have been removed — parts are spray rinsed and ready for electro-cleaning.



Preston Products Co., Grand Rapids, Michigan, quality production platers, finds HAVASOL O/SC-1 System cuts cleaning costs, adds to plating profits by doing a faster, better cleaning job — with only one bath and spray rinse.

For electrolytic cleaning — Haviland Electrolytic Cleaner 15 is an all-purpose, medium duty cleaner with high chrome tolerance, high conductivity, and extra long life, even in hard water. Safe for use on steel, zinc, copper, brass. Especially useful after Havasol O/SC-1 Soak Cleaner.

Dealer territories still open. Write for information.

HAVILAND PRODUCTS COMPANY

421 Ann Street, N.W., Grand Rapids, Michigan

Send coupon for full details

Please send me information on:

☐ HAVASOL O/SC-1 System ☐ Electrolytic Cleaner 15

Name_____

Firm_____

Address_____

City_____ State_____

THERE'S ALWAYS A LEADER!

MICCRO Products

Used Throughout the Plating Industry

Developed and manufactured by experienced platers

MICCROSOL . . .
Today's outstanding heat-cured rack coating that provides positive insulation and protection, amazing tensile strength and scuff resistance, permanent flexibility, and positive, continuous adhesion.

MICCROTAPE . . .
An extruded tape that offers unexcelled protection for plating racks, and for masking parts prior to selective plating.

MICCROTUBE . . .
An extruded tubing especially suited for use on straight or bent contact wires, and for selective plating of simple parts.

MICCROTEX . . .
A synthetic air-dry rack coating for all plating cycles and phosphate coatings—highly resistant to all plating solutions.

MICCROSTOP . . .
For masking of machined parts for all plating cycles. Hairline demarcation . . . extreme accuracy.

MICCROMASK . . .
For masking of machined parts for hard chromium plating. Provides complete protection—assures extreme accuracy.

MICCROPEEL . . .
Specifically designed to supply the need for a stop-off lacquer that can be peeled easily from the part after plating, and will hold a hairline demarcation through all plating cycles.

MICCROLAC . . .
Mirror-finish, water-white lacquer that protects and beautifies the finest of polished or plated metals.

MICCROSTRIP "A"...
A blend of the new fast solvents for the quick, easy removal of stop-off lacquers in selective plating.

MICCROLOID . . .
Industrial corrosive-resistant coating for use on all plating equipment, rinse tanks, structural steel, walls, floors, pipe lines, air ducts, etc.

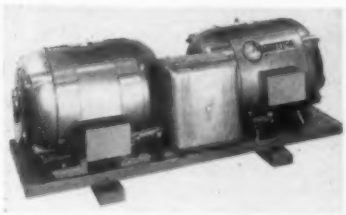
MICCROWAX . . .
Two widely used waxes for selective stop-off, especially suited for masking on complicated parts and sharp edges. C-562 for hard chromium; C-600 for high-temperature cycles.

● *Samples and descriptive literature of all Miccro Products will be sent upon request.*

MICHIGAN CHROME AND CHEMICAL COMPANY

8615 Grinnell Avenue, Detroit 13, Michigan

EXPOSITION IN PRINT



BOOTH 1

Acoustica Associates, Inc.

With the increasing use of ultrasonics in the metal finishing industries, this company, under President Robert L. Rod, has expanded its activities to meet all applications.

Acoustica Associates may be listed as manufacturers and designers of industrial ultrasonic systems with transducers for every purpose: ultrasonic apparatus, tools, accessories; electronic and motor-driven ultrasonic generators; research and engineering consultation and projects; low-cost production-scale ultrasonic systems for all manufacturing and process industries.

The ultrasonic barrier has been broken by the introduction of low-cost, high-frequency rotating generators ranging in size from 2 to 150 kw (shown above).

BOOTH 2

All-Brite Chemical Co.

All-Brite supply anodizing and plating racks. One of their racks, the Model No. 200T is made of titanium and therefore requires no stripping. Thus, the time of processing is kept to a minimum and rack costs are greatly reduced. They will last indefinitely with only minor maintenance necessary.

In addition to their anodizing racks, All-Brite do anodizing coloring of aluminum, hard chrome plating, nickel and chrome plating and chemical brightening of aluminum.

BOOTH 3

Allied Research Products

Allied manufactures Iridite finishes, a complete line of chromate conversion coatings for all commercial forms of the more commonly used non-ferrous metals; and ARP Plating Chemicals.

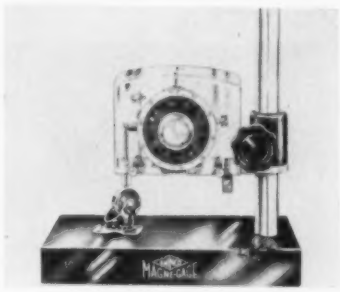
Iridite finishes are chemical treatments providing corrosion protection, decorative finishes and an excellent base for paint on zinc, cadmium, copper alloys, aluminum, magnesium and silver. They are applied by dip, brush or spray at or near room temperature, producing through chemical reaction. thin, gel-like complex chromate films which become an integral part of the metal surface. Thus, they cannot flake, chip or peel. In addition, certain Iridites produce a lustrous finish on zinc, cadmium and copper alloys through a chemical polishing action. Iridite films vary in appearance from clear through yellow to dark brown and olive drab, or they can be modified by bleaching or by dyeing red, green, blue, or black. The films have low electrical resistance, can be soldered or welded and do not affect dimensional change in close-tolerance parts.

Complete information on Iridite finishes is available in a comprehensive file of technical literature. The brochure consist of a handy file folder with eight dividers classifying data by (1) general information, (2) metal to be treated and (3) finishing processes.

BOOTH 4

American Instrument Company, Inc.

Manufacturers of laboratory and scientific instruments, super-pressure equipment, and materials testing equipment. Among the most used instruments are the Aminco-Brenner Magne-Gage. This instrument measures, by nondestructive magnetic method, the thickness of: Nonmagnetic and nickel coatings on both iron or steel and nonmagnetic materials. It has an accuracy of ten per cent of total thickness and does not mar or destroy the



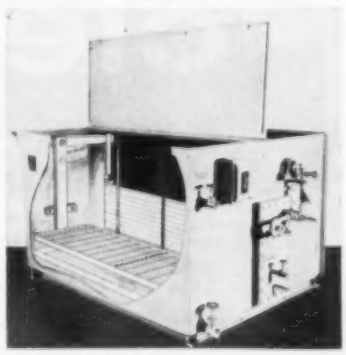
coating or base metal. Easily used, self-contained.

The Filmeter is a coating thickness gage which measures, by nondestructive electrical means, the thickness of nonconducting coatings, deposited on nonmagnetic base metals. It has an accuracy of 3 per cent of full scale in the thickness range of 0 to 0.005 inch and an accuracy of 5 per cent full scale in the range of 0 to 0.001 inches. Will not mar or destroy the coating or the base metal. May be used as a portable field instrument or on a laboratory bench.

BOOTH 5

American Machine and Solvents Co., Inc.

This company offers Fluid-Power Parts Washers. By imparting a rapid up-and-



down motion to the submerged work, these parts achieve an efficiency of cleaning which the company calls "shearing action." This action is compared to all other known methods such as air agitation, rolling boil, impeller stirring and even ultrasonic waves.

These machines are available to handle from 50 to 2,500 pounds per load; each size comes steam, gas or electrically heated, or not heated for cold solvent cleaning.

BOOTH 6

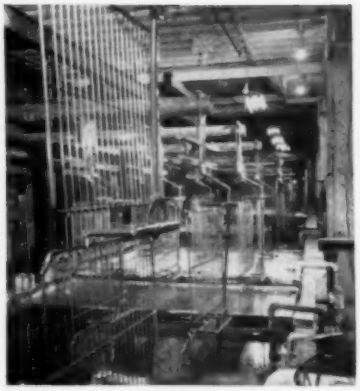
The Battelle Development Corporation

This company has the following metal finishing processes available to industry: Electropolishing, Electrodeburring, Chemical Polishing Bright Lustralite 10, Lustralite 10, 20, and 45, Standard Bright Nickel, Immersion Tin. (Some of the products are shown in the above cut.)

These processes are distributed through a nation-wide group of companies including L. H. Butcher; Enequist Chemical Co.; P. B. Gast & Sons; The Globe Chemical Co.; Hydrite Chemical Co.; Lasalco Inc.; MacDermid Inc.; G. S. Robins; and Scobell Chemical Co.

BOOTH 7

Bauer Bros. Co.



Bauer Bros. are manufacturers of machinery and welded wire products. Recently this company completed facilities for automatic plating for bright zinc, copper nickel chrome plus lacquering marks.

Their latest accomplishment, automatic plating, now makes it possible to fabricate wire products on automatic equipment and to conveyorize throughout the entire operation, even through the packing and shipping departments. (See cut above.)

BOOTH 8

Beaton & Cadwell Mfg. Co.

This company manufacturers a siphon breaker and agitator. The device was originated by them at the request of the Board of Health of the State of Connecticut. Its original development was for the prevention of any contamination of the supply line should a vacuum occur because of a break in piping below the level of a rinse tank. It has been found that this device also agitates the water in the rinse tank and if the supply valve going into the syphon breaker is only partially opened it will bring about a considerable saving in the water consumption. (See their ad in another part of the book.)

BOOTH 9

Bede Products Corp.

Bede Products Corporation, a subsidiary of U. S. Automatic Corporation, is the world's largest manufacturer of electric paint heaters and the world's only manufacturer of the Airless Spray Coating System. (Illustrated here.)

TANK HEATING PROBLEMS ELIMINATED!

CLEPCO FUSED QUARTZ IMMERSION HEATERS

Heating your acid tanks with Clepco Electric Immersion Heaters is the most modern and now the most proven of all methods known today.

ASK YOUR LEADING PLATING SUPPLIERS

OVER 100,000 INSTALLATIONS PROVE CLEPCO FUSED QUARTZ IMMERSION HEATERS ARE BEST

Clepco Steel and Stainless Immersion Heaters are designed to meet the specific demands of the Alkaline Bath heating problems of the Industry.

WHEN A BETTER HEATER IS MADE, CLEPCO WILL MAKE IT.

clepco

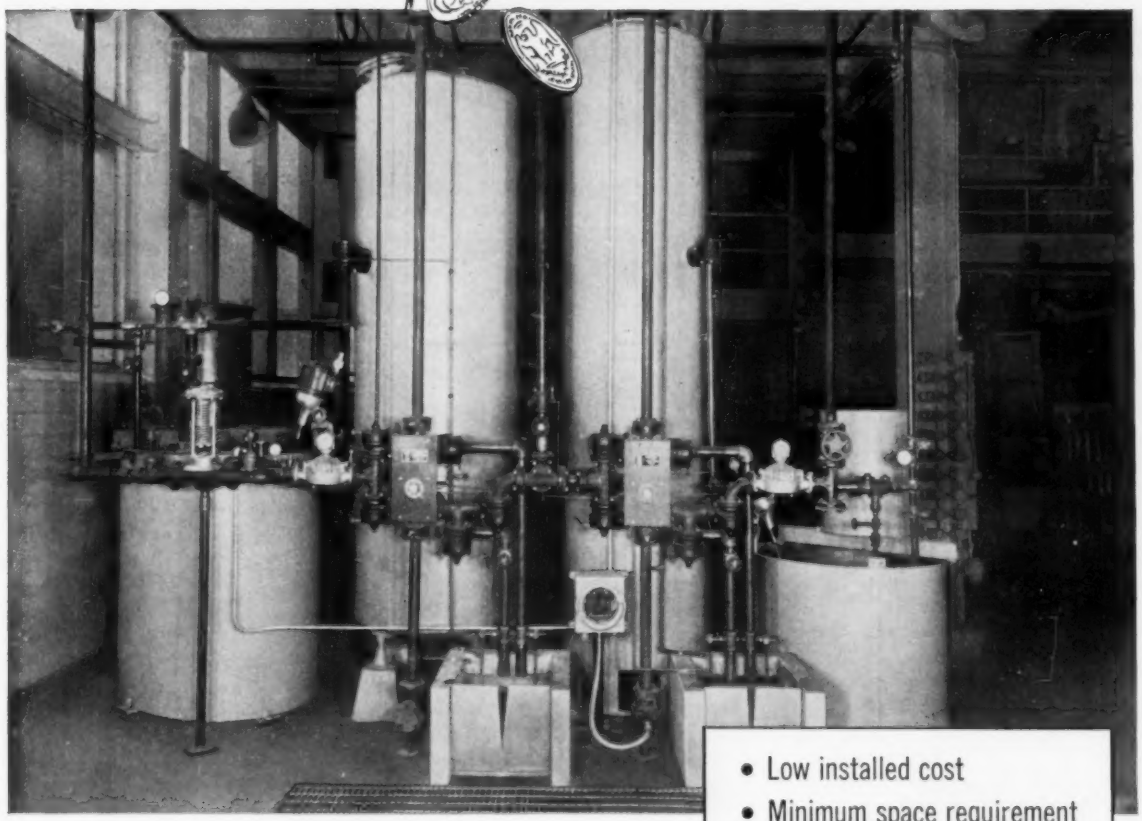
FUSED QUARTZ IMMERSION HEATERS

SEE YOUR PLATING SUPPLY HOUSE
WRITE US FOR LITERATURE

THE CLEVELAND PROCESS COMPANY

1965 EAST 57TH STREET • CLEVELAND 3, OHIO

There's Money In Your Plating Wastes!



Typical CATEXER® ANEXER® Ion Exchange Plant

- Low installed cost
- Minimum space requirement
- Chemical recovery
- Demineralized rinse water
- Simplified waste disposal

New ion exchange techniques using "CATEXER" "ANEXER" plants make it practical to recover valuable chemicals and rinse waters in some cases. Only careful evaluation will show whether recovery methods, or treatment by oxidation, reduction or precipitation is more economical. INFILCO manufactures all types of waste treatment equipment and can offer impartial evaluation of your problem. Write for complete information.

INFILCO

The ONE company offering equipment for ALL types of water and waste treatment —coagulation, precipitation, sedimentation, filtration, flotation, aeration, ion exchange and biological processes.

INFILCO INC. 933 South Campbell Ave., Tucson, Arizona
Offices in principal cities in North America 9839

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 650.

EXPOSITION IN PRINT

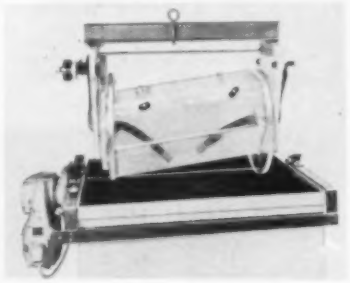
Heated paints or coating materials are pressure forced through conventional air spray guns in the Airless Spray Coating process.

Results are: Better surface coverage with less paint . . . Faster drying time . . . Less overspray . . . Least extensive exhaust systems can be used in production line coating . . . Limited spray painting can be done in the open.

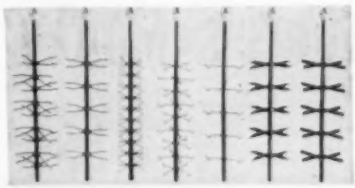
Units can be permanently installed or purchased for portable use.

BOOTH 10
Belke Manufacturing Company

More uniform distribution of plating deposit and reduced plating time are afforded by a new eccentrically mounted cylinder that oscillates as it rotates. The cylinder ends move up and down in opposite directions so the work moves back and forth. No work remains shielded by the cylinder ends where little plating occurs.



None remains buried and only partially exposed to plating current. Quality control checks show much more uniform distribution of plate specified thickness is obtained in 20 per cent less plating time than with conventional cylinders. (See cut above.)



A tremendous reduction in plating rack costs is made possible through standardized design and mass production methods. (See cut above.)

The rack spines are one-piece, solid copper, round cornered and sand blasted for perfect adhesion of the insulation.

The phosphor bronze tips are riveted then soldered when necessary for complete rigidity and positive contact.

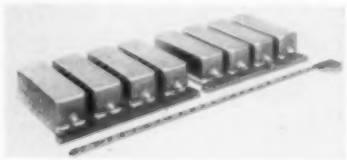
The racks are coated after assembly with universal plastic, resistant to all cleaning and plating cycles.

BOOTH 11
J. Bishop & Co. Platinum Works

Refiners and manufacturers of precious metals. This company with offices here and abroad offer platinum for all purposes, gold, silver, rhodium, etc.

BOOTH 12
Branson Instruments, Inc.

This company has been most active in the development and supply of ultrasonic equipment. They offer among other things



an ultrasonic generator together with a transducer assembly. (See cut above.) The radiating area of this transducer assembly is 4 sq ft. Transducers can be mounted in any desired configuration.

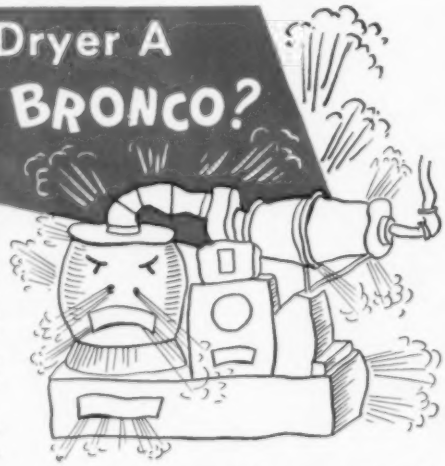
BOOTH 13
Brosites Products Corp.

This company are engineering specialists for filter media and equipment.

On an equal filtering area basis, the Brosite plate and frame filter's initial cost is lower. The filter plates and frames are designed so that filter paper may be used directly over the filter plate without a supporting filter cloth underneath. This reduces the replacement filter media cost. Nearly all plating solutions can be clarified by filter paper which can remove particle sizes in the range of 3 to 10 microns.

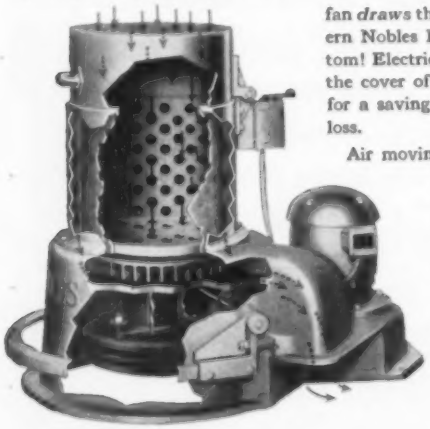
Because of the light weight of the plates and frames, this filter is easily moved around the plant and can be readily opened, cleaned, redressed, and closed for another filtering cycle.

Is Your Dryer A BUCKING BRONCO?



In order for a centrifugal dryer to stay put it should be heavy. That's why the modern Nobles Dryer is about twice the weight of most dryers. Extra weight is one of the reasons for its stability, its freedom from vibration, its smooth operation, and long trouble-free life.

It's all new in design and principle. A powerful suction fan *draws* the air completely through this modern Nobles Dryer and exhausts it at the bottom! Electric or steam heaters are mounted in the cover of this machine of advanced design for a saving of space and elimination of heat loss.



Air moving equipment isn't an extra. The powerful suction fan is an integral design feature of each machine. A brake pedal extending around the entire work area controls an internal, expanding hydraulic brake for quick, smooth stops.

Why not take the first step now toward modern quick drying and lowest costs?

NOBLES ENGINEERING & MANUFACTURING CO.
449 EAST SEVENTH STREET ST. PAUL 6, MINNESOTA

Write Today for the FREE NOBLES DRYER BROCHURE

Custom style for modern industry is the new "futurama" series which has been designed to modernize add prestige and efficiency to plant deburring and finishing departments in the barrel finishing of small precision parts for large intricate forging, casting, etc. (See picture above.)

BOOTH 73

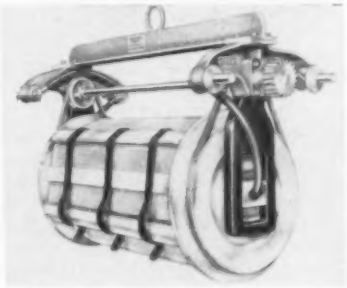
Frederic B. Stevens, Inc.

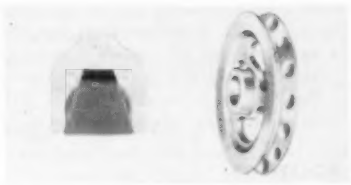
At the 1955 AES Exposition, this company introduced their "Little Steve" automatic plating and processing machine. Since that machine was first exhibited, many orders have been received for varying processes including tin-immersion, various plating processes, alodine processing, dichromating, etc. The sizes of the machines range from a midget 14 foot model to a length of 46 feet. Above is pictured the "Little Steve" as it was shown in Cleveland in 1955.

BOOTH 74

George A. Stutz Mfg. Co.

The Stutz belt drive complete cycle plating barrel pictured below incorporates a cylinder of one piece plexiglas construction. It is suspended and rotated by two



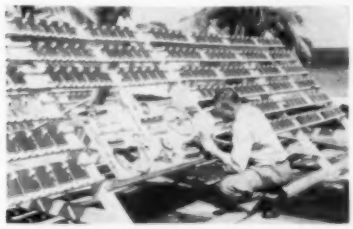


v-belts and arranged between cast-steel frames. The cylinder door is heavily reinforced and is locked with vinyl-chloride covered spring steel bung clamps. Cathode contractors are dangler type. For smooth barrel operation saddle horns are located on 15 inch centers, with four of them provided for maximum current.

BOOTH 75

South Florida Test Service

By utilizing the unique and constant climatological conditions found only in southern Florida, this company is able to



predetermine quickly the permanency and durability of a finish by actual exposure tests. Many of their clients have been with them for more than 20 years and they are also contractors to the United States Air Force and other governmental agencies. In addition to their main inland

SAVE ON SUPPLIES

12 GAL. SEMI HARD RUBBER CONTAINER . . . OUTLASTS STONEWARE JARS OR CROCKS . . . WON'T CRACK OR BREAK—NO SPILLAGE LOSS . . . AND SAFER.

DIMENSIONS—14" WIDE, 18" DEEP, ½" WALL THICKNESS—⅝" BOTTOM THICKNESS. ONLY $15.00

• STURDY STEEL BASKETS (SHOWN IN DRUM) FOR CLEANING AND PLATING PURPOSES . . . ONLY $15.95 (15" deep, 12" dia.) 6 x 6 mesh.

Rugged PLASTIC-COATED Pails-Dippers

Will withstand practically all acids and alkalies—handy for transporting materials to tanks.

"Costs less than rubber —Longer service than enamel"

ORDER NOW

2-QT. SIZE $3.30 12-QT. SIZE $6.95

PLATING PRODUCTS CO. 1509 NO. WASH. KOKOMO, IND.

ADAMS PLATING RACKS

Should be HUNG!

Yes, Sir!

. . . Hung in every plating tank for real performance and economy

•

WRITE FOR DETAILS

•

ADAMS

ENGINEERING COMPANY

TWinbrook 4-5988 WALTHAM 54, MASS.

EXPOSITION IN PRINT

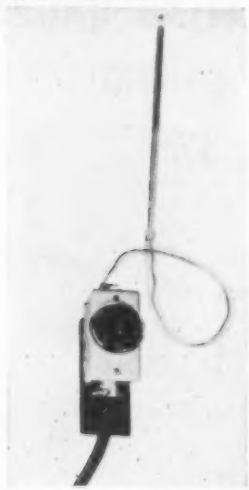
proving grounds with laboratory and storage test building, they have facilities for salt-atmospheric exposures directly on the ocean and bases for sea-water immersion tests (tide-water and total). Shown above are some automotive plating tests and general plating samples on salt atmospheric exposure.

BOOTH 76
W. A. Taylor & Company

The control of pH in certain stages of electroplating and metal finishing processes is very important and Taylor slide comparators are available in various ranges for this important function. It will probably be of interest to prospective users of this equipment to note that once a basic unit is available, the range of determinations can be extended by simply purchasing additional color slides. All slides are interchangeable on the base of the set and the color standards carry an indefinite guarantee against change. Three simple steps are all that are involved in making a determination and the operator of the equipment requires no technical training to ensure accuracy of results.

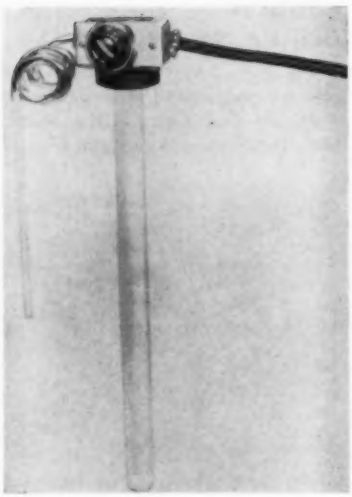
BOOTH 77
N. J. Thermex Co.

N. J. Thermex Co., manufactures a complete line of quartz, stainless steel and steel immersion heaters along with a complete line of thermostats.



The N. J. Thermex Co. recently introduced a new line of combination heater thermostat units in quartz and stainless steel under the trade name Thermex "QT" Heaters.

The "QT" type heaters assure uniform heat distribution and control and eliminate the necessity of using expensive relay switches.



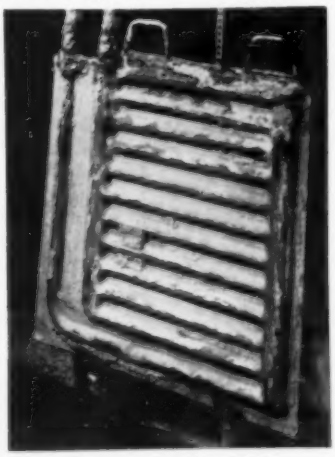
In addition to its line of immersion heaters the N. J. Thermex Co. also offers a complete line of radiant heaters for baking, heating and drying applications.

Pictured above are the Thermex "QT" Heater—and their quartz thermostat.

BOOTH 78
Thompson Mfg. Co.

This company manufactures pneumatic acid pumps, hand and power operated all-purpose hand trucks, safety carboy tilters, safety air vent pouring spouts and grinding wheel dressers. Currently advertised in another part of this issue will be found their Centri-F-Pump.

BOOTH 79
Tranter Mfg. Co.



Platecoils are now available in several special alloys to extend their application in corrosive, highly acid, and other specialized industrial processes.

Platecoils are heat-transfer units designed to replace pipe coils in industrial processes requiring the application or removal of heat. They consist of two embossed metal sheets welded together to provide a preformed channel for the flow of heating or cooling media. The cut above shows a stainless steel platecoil heat-transfer unit that has served continuously for more than a year without requiring cleaning.

BOOTH 80
Tru-Sorb Corp.

A full line of maize cellulose for drying, polishing and deburring. This includes both the meal and the grit which is thoroughly graded for uniformity of grain size and the elimination of dust and other foreign matter. It is available in all grade sizes and the supply is constant. This company has many points of distribution.

Also available is a full line of graded sawdust produced only from kiln-dried rock maple. This matrial is also thoroughly graded for uniformity of grain size and the elimination of dust and other foreign matter.

Their maize cellulose and hardwood sawdust will not stain, stick nor become imbedded in parts when the proper grain size is used.

BOOTH 81
United Buff Products Corporation

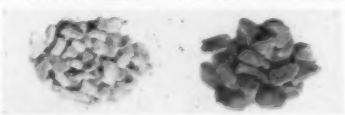
This organization produces "Pressure-Cooled" buffing wheels, "Aircon" contact wheels for abrasive belts, and "Flanair" color buffs. They also offer technical service and facilities to all electroplaters and metal finishers for analysis and solution of buffing and polishing problems.

BOOTH 82
Unit Process Assemblies, Inc.

This organization manufactures periodic reverse units for electroplating of copper, silver, brass, etc., and for electrocleaning in alkaline derusting baths. Also, the dermitron nondestructive thickness tester for measurement of metal deposits on metal base, nonconductive films on metals, and metallic films on nonconductors is theirs.

BOOTH 83
Universal Tumbling Supply Company

Universal Tumbling chips and supplies are now available at the most economical



price to the tumbling industry. They offer free, no obligation Econo-Pack

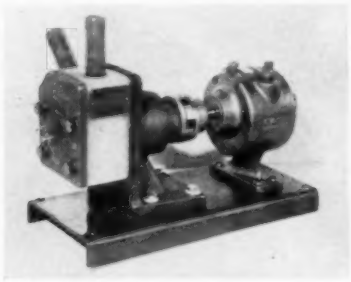
catalog and free mixed samples of limestone and granite chips. You may submit samples for a free, no obligation, recommendation run in our experimental tumbling shop.

Shown above are granite chips on the left and Universal chips on the right.

BOOTH 84

Vanton Pump and Equipment Co.

Here is a unique new rotary pump designed without stuffing boxes or shaft



seals, particularly suitable for handling plating solutions. No metal parts are ever in contact with the fluid pumped, only the outer surface of the synthetic flexible liner and the inner surface of the plastic body block. A wide variety of materials are offered permitting the safe handling of all the plating solutions without fear of contamination or corrosion. The lack of seals of any sort permits the pumping of expensive gold and rhodium baths. Self priming and easily adaptable to filters, these units are offered in a size range from ½ to 20 gpm and temperatures to 265°F.

BOOTH 85

Wambaugh Chemical Company

This company offers plater's remedies—they claim to be the first line of defense against retardation. They have remedies for the healing and prompt relief of burning, itching and torment caused by any portion of the body coming in contact with chromium, nickel, cyanide plating solutions or fumes therefrom.

BOOTH 86

Wheelabrator Corporation

Wheelabrator Corporation offers to the electroplating and metal finishing industry the Liquamatte wet abrasive blasting machine, for precision cleaning and finishing.

Pictured above are one model of Liquamatte and a close-up of the cleaning compartment.

Wet blasting is applicable to the following cleaning and finishing problems in the plating industry: cleaning, deburring, and defeathering sharpened tools prior to plating (either in reconditioning or in original manufacture); producing lubricant-retaining surfaces on tools after plating; cleaning and surfacing plastics molds, drawing dies, and the like before

and after plating; producing bonding surfaces for plating; providing satin finishes prior to two-tone anodizing or plating of decorative hardware; making satin finishes on already plated parts for reducing glare; and blending grinding lines, machine tool marks, and blemishes on steel, leaving a uniform non-directional, matte finish.

Three standard sizes of Liquamattes are available; specially-designed and tailor-made machines are also made for particular requirements.

BOOTH 87

Wiretex Manufacturing Company

A new heat-treating heat retort basket holds tools of all sizes and eliminates the danger of their falling through the grid while being processed in pit-type furnaces.

The anodizing of small metal parts such as screws, nuts, camera parts, etc., are easily handled in a new aluminum anodizing basket.

A new tray designed for small part brazing at elevated temperatures is also offered by this company.

BOOTH 88

Wyandotte Chemical Corp.

Manufacturers of specialized chemical products for the metal working and metal finishing industries. Wyandotte Products are used extensively for the following operations: Barrel finishing; Buffing compound removal; Cleaning and phosphating; Deoxidizing aluminum; Electrocleaning ferrous and non-ferrous metals; Neutralizing after pickling; Oil and water absorbent; Paint spray booth maintenance; Paint stripping; Soak cleaning and barrel cleaning; Protection against rust; Washing machine cleaning.

Trained service personnel are available in all principal production centers. Wyandotte Products are maintained in local storages throughout the U.S. and Canada. Technical Service laboratories are maintained both at Los Nietos, California and Wyandotte, Michigan. Extensive research laboratories in Wyandotte contain special pilot equipment for practical research and customer service in metal processing and cleaning problems.

BOOTH 89

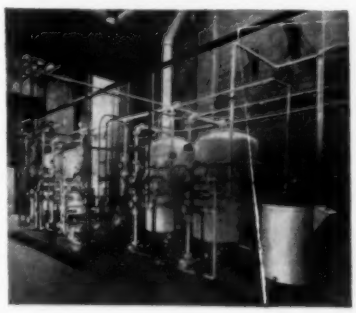
F. J. Stokes Corporation

This company recently changed its name from F. J. Stokes Machine Co. to the above. They still manufacture vacuum metallizing equipment, however, and continue to use imagination and technical proficiency in its design and manufacture. Their two most popular sizes with electroplaters are the 36 in and the 48 in units. If this were a simple encyclopedic listing the products of this company would also be listed under "Vacuum Plating Equipment" and "Continuous Roll Metallizing Equipment, Vacuum".

BOOTH 90

Graver Water Conditioning Co.

Complete water treatment systems as well as waste disposal plants are the forte of this company. All the tools with which these jobs can be accomplished are offered: demineralizers, water filters, reactivators, diatomite filters and ion exchange chemicals as well as zeolite softeners. The plating industry can profit by this company's installations through their chromium reactivator systems, to say nothing of water softening chemicals.

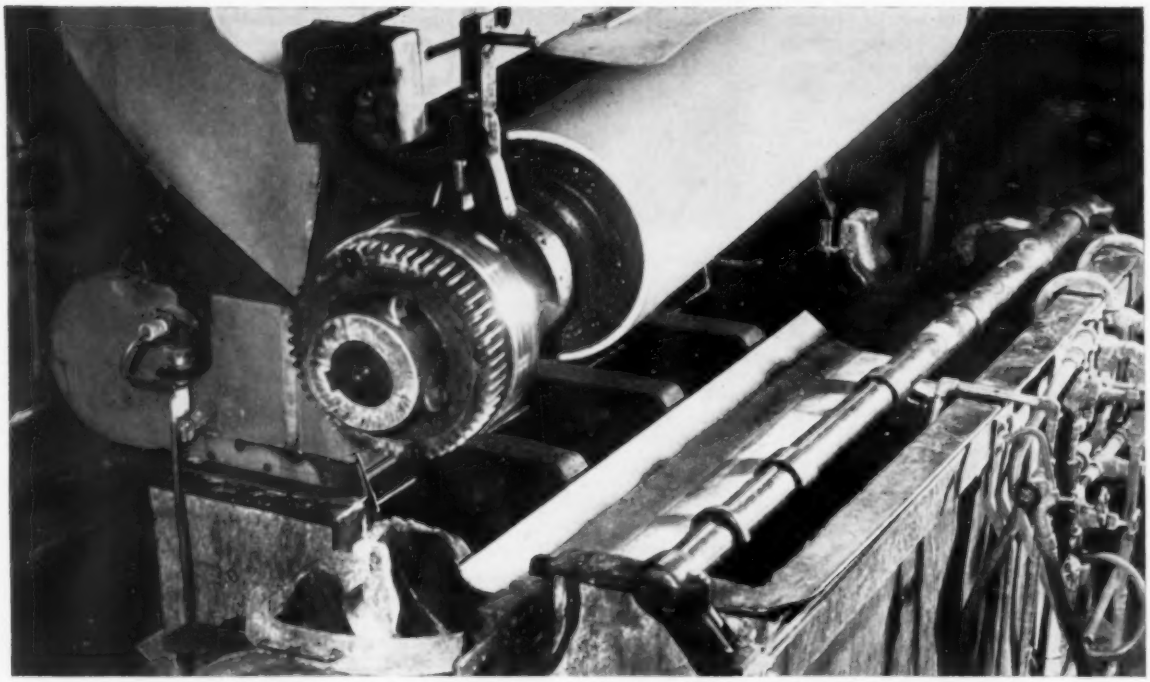


The illustration shows a Graver ion exchange system with double action and double anion units. This type of system is widely used for recovering valuable waste material and produce the purest water possible.

BOOTH 91

Sandoz Chemical Works

Sandoz manufactures and sells a complete line of dies for the coloring of anodized aluminum. These dies are rated as to fastness to light and five of them are recommended for outdoor applications.



View of plating tank, drained to show location of the 67" x 3" x 1" "Plus-4" Anodes.

Electroplating copper shells on rotogravure cylinders is simpler and faster with "Plus-4" Anodes

Triangle Publications, Inc., has an enviable reputation for high-quality 4-color gravure reproduction at high speed. Here are three of its leading magazines.

TRIANGLE PUBLICATIONS, INC., Philadelphia, made comparative tests, for a 22-month period, of "Plus-4" (Phosphorized Copper) Anodes in the electroplating of rotogravure cylinders.

The results were summarized by the Director of Triangle Publications' Research and Development Laboratories: "'Plus-4' Anodes give an improved copper printing surface with substantial savings in time, labor, and material—and our men like to use them."

Plating procedure: 1500-lb. steel rotogravure cylinders, 67" long and 43" in circumference, are cyanide-copperplated .0005"—then acid-copperplated .040" to .080". This surface is ground and polished and coated with immersion nickel. A .005" copper Ballard shell is acid-plated over the nickel—the shell which is engraved and forms the printing surface. The nickel layer makes it possible to strip the outer shell off after printing. Another shell is then plated on the cylinder for the next job. The dense physical quality of the unchromed copper Ballard shell makes it possible to print 1,250,000 impressions from a single set of design cylinders.

For electroplating, the cylinders are placed horizontally in the acid-copperplating solution ⅓ submerged, and rotated. The anodes lie parallel to the cylinder, 1½" to 2" away. Current density is 280 to 300 amps per sq. ft.

Solution balance: With other anodes, solution balancing to remove copper sulfate and add acid is necessary 20 to 22 times a year. With "Plus-4" Anodes, the solution has been balanced only 4 to 6 times a year. This not only made substantial savings in copper sulfate and acid, time, and labor—but also gave improved control of the plating process by minimizing cyclic changes in the solution.

Anode corrosion: When anodes corrode faster in length than width, low areas develop at the ends of the roll—and anodes must be scrapped. Scrap loss with other anodes has run 8 to 10%. "Plus-4" Anodes corrode so uniformly, however, that scrap was only 1 to 2%. They produce uniform deposits with less attention and checking.

Cathode deposit: With "Plus-4" Anodes the sharp reduction of copper lost as sludge and in copper sulfate dumped accounted for a 12 to 14% increase in cathode deposit.

See for yourself: Across the entire field of acid-copper electroplating—"Plus-4" Anodes are saving money, making work easier. Write today for details of how you can get a test supply of "Plus-4" Anodes sufficient to fill one tank. Address: The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 56140

"PLUS-4" ANODES
(Phosphorized Copper)
an
ANACONDA®
product
made by
THE AMERICAN BRASS COMPANY
For use in Patent No. 2,689,216

PRESIDENT'S REPORT

Clyde Kelly

During the past year, your Society has made moderate progress in some of its activities. In several areas, advancement has been substantial.

The Society has continued to grow in numbers at about the same rate as other similar organizations. The work of the Research Committee continues to be one of our outstanding achievements. This important effort merits your continued and increased support. I invite you and urge you to study the excellent report of Research Chairman L. C. Borchert in this connection.

We must remember that the purpose of our Society is education. In this field, the Editorial Board has done an outstanding job. During the past year, this group compiled a set of by-laws to guide them in the performance of their duties. These rules have long been needed and should be of great assistance to future Boards. Through their combined efforts, we now have a small backlog of papers for PLATING magazine. The publication's nature and integrity are due in large measure to the services and policies of the Editorial Board.

The Educational Committee, under the direction of Dr. Samuel Heiman, has done what can truly be described as a monumental task. This committee has already completed several sections of the Branch Officers' Manual, including a most important section on plating classes. This section should greatly assist branches which are presently conducting or which are contemplating the start of classes in plating.

I recommend that the Society give serious consideration to the matter of establishing a correspondence course in plating. While many branches have excellent classes, a very large section of our membership does not have access to the kind of instruction which they should have. I shall report further on this subject at the forthcoming convention.

Some of the most effective work of the Society is carried out by committees appointed by the President. Chairmen of these committees select their own working members and carry on important liaison with other societies in addition to performing special tasks at the request of the President. It is unfortunate that the only recognition these people receive is the knowledge that they have done their job well. This year, however, in order that more members be informed of our inter- and intra-society activities, Delegates and Branch Secretaries will be given copies of these reports. To these committee chairmen and to the many others who have offered to serve go my heartfelt thanks and appreciation.

During the past year, I have participated in monthly and annual meetings of many branches. I have discussed the operation of the Society in an effort to have them understand what makes the Society "tick." In addition, I have attended all the meetings of the Research Committee and Editorial Board in a further attempt to better my understanding of their problems and, when possible, to assist.

The Society experienced a deficit during the past fiscal year. This was due largely to increased printing costs and to the fact that our advertising revenue was less than was estimated. The Society deficit was about what was anticipated. The PLATING account, however, did not meet the large surplus that was expected. Because of the fact that regular reports other than quarterly statements have never been provided, the Executive Board was not aware of the financial situation until the final audit was made. Instructions have now been issued for the submission henceforth of monthly statements so that a more complete picture may be shown. These statements, similar to those issued by private firms, will show the receipts and anticipated, as well as actual expenditures prorated so that we will know at all times just what is the real financial picture.

The Industrial Finishing Exposition turned in an excellent profit. Of course, this is not considered in the budget since it was a balance sheet item. I shall report further on the year's deficit at the convention.

The Society headquarters continues to grow in size and also in performance. Additional space and equipment has been provided in the interest of efficiency and in a further attempt to serve you better. You may well be proud of your headquarters and the people who operate it. To the national staff go my sincere thanks for their assistance and support. It has been the most rewarding experience of my term as President.

Clyde Kelly
President

FIRST VICE - PRESIDENT'S REPORT

Samuel Heiman

In addition to the regular duties and work on the Executive Board, the following specific projects were carried out by or under the direction of your First Vice-President who, according to the By-Laws of the Society, is chairman of the Educational Committee. The many educational activities—at branch and national levels—have been discussed and are well known. These have continued to be supported and fostered. They are referred to in the reports of the President and Executive Secretary.

BRANCH EDUCATIONAL PROGRAM

1. Supplementary Speakers' List

The technical talks delivered at branch meetings are probably the most important branch educational activity.

Information for the regular Branch Speakers' List is obtained from companies who are able and willing to supply speakers for branch meetings. However, many branches generally obtain a few speakers a year from local members not listed in the regular Speakers' List. These talks are a matter of record in PLATING but the information is scattered and relatively inaccessible.

A Supplementary Speakers' List was compiled which listed the names of 280 such speakers in the period 1950-1955 as well as the subject date and branch addressed.

This list enriches the choice of speakers and the variety of subjects available and should therefore, make for more interesting branch meetings. This list was distributed to each President, Secretary and Librarian of all branches on August 8, 1955. It will be kept up to date yearly.

2. Motion Picture Directory

This Directory was compiled by R. L. Flint and T. W. Hull and edited by S. S. Knight, I. W. Marcovich and S. Heiman. It lists and describes 150 films of interest to AES members which are suitable for presentation at branch meetings. Use of this directory should contribute to more interesting meetings. It was distributed to the President, Secretary and Librarian of all Branches on January 9, 1956.

3. Educational Courses in Electroplating and Metal Finishing

A survey conducted by L. Serota, A. G. Pierdon and F. Ogburn showed that the educational facilities for training electroplaters in this country are relatively poor with little recent activity.

A comprehensive 24-page report titled "Organizing and Maintaining a Course in Electroplating" was written by your First Vice-President to assist branches in sponsoring such a course.

The report gives considerable background material on the subject, a detailed discussion of subject matter and course of study, the pitfalls involved and specific procedures for organizing and maintaining a class. The report was distributed to all branch officers on February 20, 1956.

Branch officers can further the basic aims of the AES as an educational society in no better way than by sponsoring an educational program in their areas. The branch president himself should take the lead in this matter.

PLATING MAGAZINE

1. Specifications

Arrangements were made for PLATING to give increased coverage to finishing specifications and to report changes on government specifications as they are made. Particular attention is being given to the specifications of government services, the ASTM and SAE.

Contributions will be made by authorities in the field and will be published periodically when available. Initial contributions for PLATING were solicited and received from S. F. Sherman, N. E. Promisel, J. Teres and F. Ogburn.

2. Article References

A department was initiated which lists the titles and references of a large number of articles on metal finishing which are published in a selected number of magazines. It is felt that the title is a sufficient clue for the reader to decide if he is interested in that article. Reprints, in many cases, free, may be obtained by writing directly to the magazine concerned.

The Society is indebted to W. M. Tucker who volunteered to carry on this department and who will undoubtedly further expand and improve its usefulness.

3. "Meet Mr. President"

This feature was organized to give increased recognition and publicity to branch presidents who supply vital leadership and direction to branch activities.

BRANCH OFFICERS MANUAL

During this year, the following sections of the Manual were carefully revised and edited, then released:

Motion Picture Directory	January 1956
Courses in Electroplating and Metal Finishing	February 1956
Branch Meeting Notices	April 1956
I. K. Hauseman and I. W. Marcovich	
Public Relations — C. F. Nixon and P. P. Kovatis	April 1956
Organization Chart of AES	April 1956

Time-consuming editing continues to slow up the pace of publication of material on hand and this delays its use by branch officers. Under these circumstances, we intend to publish as soon as possible the remaining unedited sections of the Manual so that it may be put to use.

CONVENTION MANUAL

Editing and completing where necessary of the Convention Manual was finished this year by Manson Glover. The Manual was published April 1956. This detailed and comprehensive 52-page report has been distributed to the Washington and Montreal convention committees where it should serve as a guide in the mechanics of planning and operating the annual convention. It should help make the work of convention committees more effective and efficient. I wish to express the thanks and appreciation of the Society to Manson Glover, Clyde Kelly and the several members of the 1953 Philadelphia convention committee for their substantial contribution to the Manual.

Samuel Heiman
First Vice-President

SECOND VICE-PRESIDENT'S REPORT

Francis T. Eddy

The Second Vice-President of your Society is charged with the responsibility of directing activities to increase and encourage the membership of the various Branches, and to assist the formation of new Branches wherein possible. The growth of the membership over the past year has been attained as it always will be, by the sustained efforts of every AES member.

For the year 1955-1956 a great deal of activity has taken place in recruiting new members and new Branches, resulting in a 2 per cent increase in membership, and the addition of one new Branch to the field (the Mississippi Valley Branch at Rock Island, Illinois). The list of sustaining members has been increased by 6.2 per cent. Individual membership on March 31, 1956 stood at 6,742. Sustaining membership at 371.

For the winners in the three classes of Branches, the following have achieved the greatest growth in the past year.

126 and larger class—
Los Angeles with an increase of 12.5 per cent

70 to 125 member class—
Montreal with an increase of 14.1 per cent

10 to 69 member class—
Southeastern with an increase of 34.6 per cent

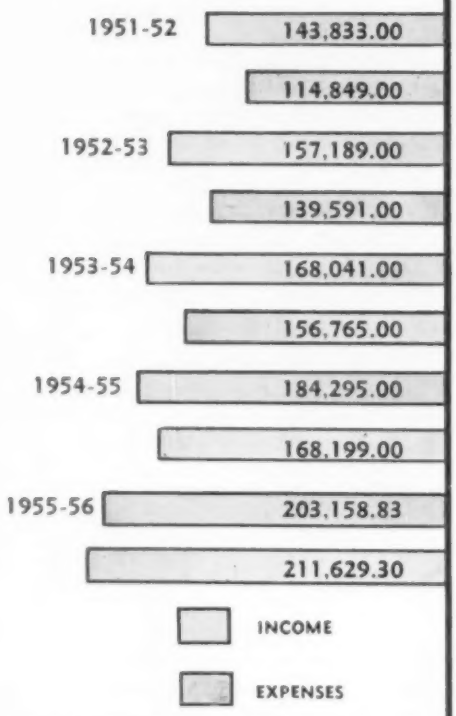
It is most gratifying that these particular areas are creating and maintaining this interest.

It should also be mentioned that during the year, several cities have begun to form the nucleus of several potential Branches. The cities are: Mexico City, Mexico; Fresno, California; Vancouver, British Columbia; Miami, Florida and Greensboro, North Carolina.

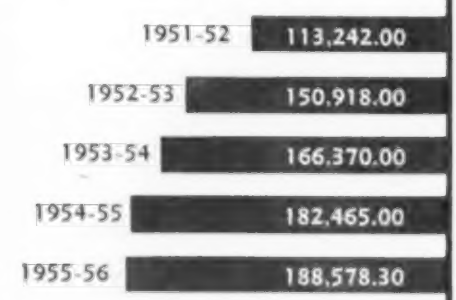
The progress of the growth of Society membership in all forms is a continuing challenge from year to year. Each succeeding Second Vice-President has, and will add a measure of success to the records of AES. It has been a pleasure and privilege for the incumbent to aid the AES to the best of his abilities, not only as chairman of the membership committee, but also as a member of the Executive Board. Your continued interest in the Society and guidance of its officers will insure a better American Electroplaters' Society tomorrow.

Francis T. Eddy
Second Vice-President

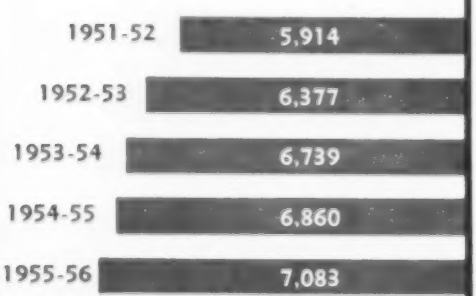
AES GROWTH AT A GLANCE



NET WORTH, GENERAL FUND



MEMBERSHIP*



*Includes Branch Members, Members-at-Large and single Sustaining Members

Membership Report as of March 31, 1956

BRANCH	MEMBERSHIP MARCH 31, 1955	ELECTED	REINSTATED	TRANSFERRED IN	TRANSFERRED OUT	RESIGNED	SUSPENDED	DEAD	NET GAIN	MEMBERSHIP MARCH 31, 1956	SUSTAINING MEMBERSHIP CREDITS
Adelaide	42	5	—	—	—	1	1	—	+3	45	—
Allentown-Reading	40	3	—	—	—	1	—	2	—	40	3
Baltimore-Washington	101	12	1	2	1	4	11	1	−2.5	99	5
Boston	137	17	—	—	2	—	22	—	−6	130	5
Bridgeport	152	12	2	2	4	3	11	1	−2	149	5
Buffalo	93	21	2	1	4	—	10	—	+11.5	103	1
Capitol District	51	7	1	2	—	—	5	—	+4	56	2
*Central Michigan	56	7	1	—	1	1	2	—	+4.5	60	—
Chicago	493	38	—	5	13	6	58	3	−33	456	73
Cincinnati	89	19	1	—	1	2	5	1	+11.5	100	2
Cleveland	260	21	1	7	—	9	4	—	+12.5	276	19
Columbus	74	3	—	2	2	6	—	—	−3	71	—
Dallas-Ft. Worth	48	6	1	1	—	2	—	—	+5.5	54	1
*Dayton	92	12	—	2	2	4	1	1	+6	98	4
†Detroit	668	67	8	5	7	21	47	1	+5	672	45
Grand Rapids	179	13	—	2	2	3	5	1	+4	183	15
Hamilton	26	5	1	—	1	—	1	—	+4.5	30	4
Hartford	168	16	—	—	1	4	8	3	+.5	168	5
Houston	29	1	1	—	—	—	—	—	+2	31	1
*Indianapolis	113	11	1	3	1	8	6	—	−1	113	2
Kansas City	49	1	—	2	1	—	—	—	+1	51	—
Lancaster	62	12	—	1	1	3	6	—	+3	65	2
1c*Los Angeles	272	31	1	6	—	—	—	1	+34	309	20
Louisville	38	10	—	—	—	1	11	—	−2	36	1
Melbourne	161	19	6	—	—	6	20	—	−1	160	—
Milwaukee	178	22	1	1	1	5	9	—	+9	187	14
‡Mississippi Valley	29	3	—	5	—	1	—	—	+4.5	36	1
2cMontreal	78	15	1	—	—	2	1	2	+11	89	3
Newark	275	28	8	2	6	5	27	4	−2	271	12
New Haven	98	6	—	—	1	2	5	—	−1.5	96	4
New York	394	32	2	1	9	6	75	2	−53	337	13
Philadelphia	225	19	4	—	4	6	14	2	−1	222	13
Pittsburgh	138	9	7	3	1	2	20	—	−5	134	5
Portland	21	5	—	—	—	—	3	—	+2	23	—
Providence-Attleboro	90	12	—	1	1	3	2	2	+5	95	2
Rochester	89	10	3	1	1	2	8	1	+2	91	3
Rockford	79	7	—	—	6	—	5	—	−1	75	1
Saginaw Valley	107	13	2	1	1	5	3	3	+4	111	—
St. Joseph Valley	81	13	2	2	4	2	3	—	+9	89	4
*St. Louis	92	27	4	—	—	10	16	1	+4	96	11
San Antonio	18	6	—	—	—	1	5	—	—	18	—
San Francisco	79	10	1	—	—	1	9	—	+1	80	—
Seattle-Puget Sound	35	8	—	2	—	—	3	—	+6	42	—
3cSoutheastern	52	23	1	—	—	—	6	—	+18	70	2
Southern Tier	32	3	—	—	—	—	—	—	+3	35	1
Springfield	67	2	—	1	3	6	2	—	−7	59	2
Sydney	93	14	—	1	—	—	10	—	+4.5	98	—
Syracuse	117	19	—	1	2	2	16	4	−3.5	113	1
Toledo	50	4	1	—	—	3	4	1	−3	47	1
*Toronto	149	26	3	1	2	4	7	2	+15.5	164	10
*Twin City	77	—	—	—	1	—	—	—	−.5	76	1
*Waterbury	134	14	1	1	2	2	2	1	+9.5	143	18
*Western Ontario	29	3	—	1	—	—	—	—	+3.5	33	3
Wichita	48	3	—	—	—	—	6	—	−3	45	1
Member-at-Large	161	59	3	2	3	1	10	1	+49.5	210	—
Totals*	6608	784	72	70	92	156	505	41	+143	6740	341

* Net gain is computed by rating transfers at .5.
c Winners in 1955-56 membership competition.
* Includes branch contributions.
† Does not include 3 students and 1 member in Armed Forces.
‡ Under temporary charter.

THIRD VICE - PRESIDENT'S REPORT

Herberth E. Head

It has been the feeling of your Third Vice-President, a new member of the Executive Board, that his duty to the Society could best be fulfilled by visiting as many branches as time will permit. By so doing he is able to gather together the current thinking of the membership and bring it to the attention of the Executive Board. He also has an opportunity to review the policies of the Society and whenever desirable, recommend to the Executive Board such changes as may be felt will facilitate smoother operation of the business of the Society.

Your present junior member of the Board has occupied all his available time in pursuit of such duties. I have attended all the Executive Board meetings, and the Annual Meeting held by the following branches: Philadelphia, Detroit, Saginaw Valley, Central Michigan, Southeastern, and St. Joseph Valley. I have attended regular branch meetings of Western Ontario, Saginaw Valley, Central Michigan, Toledo and all the meetings of the Detroit Branch.

With the consent of the Executive Board, I have written to all the branches regarding Branch Exhibits. I attempted to explain the problems involved in holding Branch Exhibits and asked that a card, inclosed with the letter, be mailed to me in order that the Board might have an expression of all the branches in regard to this matter.

I appreciate the opportunity given me by the membership to serve the Society, and assure you that I will execute to the best of my ability the duties imposed with acceptance of the office. I join with the other members of the Board in standing ready and willing to accept any suggestion that the members may care to offer.

Herberth E. Head
Third Vice-President

PAST PRESIDENT'S REPORT

Ralph A. Schaefer

Over the years, our Society has enjoyed continued growth of stature both technically and financially. This trend is rapidly placing the Society in a position of becoming the mouthpiece for the metal finishing industry. The activities of the Society, or the cornerstones upon which this prestige rests, are its technical publications, conventions, expositions, and an active, realistic research program. These four functions provide opportunities for disseminating technical information to the membership.

The essential responsibility of the Executive Board, together with its appointed committees, is to foster an atmosphere conducive to the easy flow of information among Society members at both the branch and national levels. These tools or mechanics of communication have been substantially enhanced in recent years by such policy decisions as a permanent headquarters, professionally trained staff, higher publication standards, etc. As long as the Executive Board provides positive leadership in the creation of greater opportunities for the free exchange of metal finishing information among the membership, the Society will continue to prosper.

This growth will be assured if the Supreme Society elects aggressive, well-grounded and mature individuals to its highest offices. These candidates will have established themselves in our industry with a proven and respected record of business and technical accomplishment. In addition to professional maturity, they should possess a broad general knowledge of Society problems acquired by active participation in standing committees and branch affairs, since there is no substitute for experience. For the Society is similar to a business; both must be managed by individuals who have acquired operating knowledge from practical experience in handling personnel, technical, and financial problems.

Naturally, it is with some regret that I retire from active participation in Society affairs. However, the privilege of serving the American Electroplaters' Society in its highest offices is deeply appreciated, and will be remembered long after these words are forgotten.

Ralph A. Schaefer
Past President

EXECUTIVE SECRETARY'S REPORT

P. Peter Kovatis

GENERAL

The year 1955-1956 was one of additional membership growth especially in the Membership-at-Large and Sustaining Membership categories. There was only a one per cent net increase in Branch Membership this year over the past year, while a most favorable increase of 30.4 per cent was experienced in the Membership-at-Large category. Through the exceptionally fine work of branch members, spearheaded by A. P. Wrisberg, Research Committee Finance Vice-Chairman, there was a 10 per cent increase in Sustaining Members this year in comparison to 1954-55. Net membership change including single Sustaining Members, Branch Members and Members-at-Large was 2.3 per cent.

Financially speaking, a surplus of $17,383.31 from the 4th Industrial Exposition offered a favorable increase in the net worth or General Fund. However, due to an inevitable increase in our cost structure, there was a net deficit of $8,470.47 in the combined Society budget and PLATING estimate based on actual figures. The following summaries will show how the Society progressed during the past year:—

FINANCIAL

There was an excess of $5,366.32 in income over expenses in the operation of PLATING Magazine during the year while the Society account experienced an excess of $13,836.79 expenses over income for the same period. The balance sheet of March 31, 1956 showed a net worth of $183,578.30 or an increase of $6,112.84 in our net worth during the year, not including the Research Fund balance. There was a 7.8 per cent increase in expenses during the year in operation of PLATING Magazine, attributed mostly to an increased publication cost and higher salaries. During the year we printed 6400 copies more than in the preceding fiscal year. There were also 350 additional pages of editorial material as well as 50 additional pages of advertising. The cost for this additional material was $19,792.00, a figure over which we could exert no control. Hence, if $19,792.00 is subtracted from the total cost of printing, the remaining $64,308.00 is comparable to the 1954-55 expenditure for an equal amount of product. Despite the increase, through careful editorial-production management, we produced 25 per cent more pages and 8 per cent more copy for only 12 per cent additional cost. This in effect, is a saving of $10,188.00 on the *estimated* budget. Or, in other words, we experienced lower unit costs in the present fiscal year in comparison to that of 1954-55.

PUBLICATIONS

The PLATING print order for April 1956 issue was 9,170 and was distributed as follows:—

Members: Active & Sustaining	7083
Subscribers	1098
Advertisers, Agencies, Exchange and prospects	543
Inventory	446
Total	9170

There was a net increase of 50 subscribers during the year.

There were additional innovations and improvements to PLATING Magazine thanks to the efforts of Richard Huntley and Arch Doria. We also added Robert Buehler to our staff during the year in the capacity of Assistant Advertising Manager and his addition has been a most pleasant and rewarding one to the magazine. A new Media Data File, prepared by Advertising Manager George Burnley, was distributed during the year and was reproduced in several publications, including PRINTERS' INK. During the year, the Executive Board authorized an increase in advertising rates which took effect May, 1956.

The "New Look" of PLATING Magazine has met with wide acclaim and approval and we are thankful to the many subscribers and members who have written to commend us for it. We shall constantly strive to make PLATING Magazine the leading publication of our field, as it should be.

PROCEEDINGS

The 42nd Annual PROCEEDINGS was published and was in most members' hands before Christmas, 1955. Although there were more pages in PROCEEDINGS, we paid $14,795.24 or only a $219.38 increase in cost over the previous publication. If we proceed under the present plan, the 43rd Annual PROCEEDINGS will cost in the area of $27,600 because of a larger PLATING Magazine. It should be pointed up once more that the primary reason the Society budget suffers an excess of expenses over income is due to the fact that there is very little income for the large expenditure involved in the printing of this book. At this juncture, the Executive Board is studying a plan whereby costs of printing Technical PROCEEDINGS would be decreased.

BRANCH ACTIVITIES

One new branch petitioned for a permanent charter during the year. This was the Mississippi Valley Branch with Headquarters in Rock Island, Illinois. New branches are in the process of being formed in Miami, Fresno, Greensboro, and Vancouver, B. C., with a remote possibility of one in Mexico City.

Seventy-four items of Branch News appeared in PLATING during the past year. This is 33 more items than in the preceding year, plus a total of 51 photographs or 21 more photographs published in connection with Branch News than last year.

EDITORIAL BOARD

The drafting of a Constitution and By-Laws for the operation of the Editorial Board was probably one of the most significant contributions by this group in 1955-56. The following committee, headed by AES Past President F. Fulforth, took on the task of compiling these By-Laws: A. W. Logozzo and Dr. A. Brenner.

Through the untiring efforts of Dr. A. Brenner, Washington Convention liaison member to the Editorial Board, and with the help of the individual members of the Board, completed manuscripts and abstracts were obtained, probably for the first time in many years, at deadline time. This year's educational program accomplishments augur well for the future and serve up a challenge to succeeding Editorial Boards and Convention Educational Chairmen.

Through the continued and sustained efforts of the Editorial Board we are confident that papers for conventions and PLATING Magazine will not only grow in number but in over-all quality.

HEADQUARTERS

To meet the increasing needs of a growing membership and a larger magazine, it was necessary to add three full-time staff people and one part-time. We have continued to improve our working conditions with the procurement of additional equipment. In addition, with the cooperation of our landlord, the Lauren Co., we were able to re-paint certain offices and to soundproof all the offices except that of the Executive Secretary. We also have added two rooms to Headquarters by converting an old stock room.

During the year, your Secretary has attended 28 branch functions, six intra-Society meetings, two regional meetings, twelve committee meetings, and six inter-Society meetings. In addition, your Secretary has attended more than 40 meetings of local civic and community groups, including the YM-YWCA, Community Chest, and other groups.

Finally, despite financial difficulties during the year, it is our belief that the 1955-56 year was highly successful. In the building of any organization, the initial financial investment is usually a large one. However, the fruits of this investment will become apparent as time goes on. This year, therefore, has been a year of investment. It has been a year in which we performed some important ground work for tomorrow's Society.

My heartfelt thanks and appreciation go to a devoted, hard-working staff and to the many members who have assisted us in the furtherance of our goals.

P. Peter Kovatis

NECROLOGY

Of the following members who have died during the year, many have contributed greatly to the advancement of the Society. Branch members and friends mourn their passing.

Allentown-Reading Branch: N. H. Miller, Dr. R. M. Wick

Baltimore-Washington Branch: T. F. Slattery

Bridgeport Branch: G. DeMattio

Chicago Branch: F. W. Baesler, H. Faint, W. Varnish

Cincinnati Branch: J. W. Magly

Dayton Branch: W. H. Hartzell

Detroit Branch: W. R. Ivers

Grand Rapids Branch: R. N. Brach

Hartford Branch: N. Farrington, W. Lamie, J. L. Post

Los Angeles Branch: J. Murrieta

Montreal Branch: J. Feeley

Newark Branch: R. Doucette, T. Gardner, L. Wheeler, O. Zorrer

New York Branch: E. Cicio, H. Eisenberg

Philadelphia Branch: A. Hirsch, H. G. Orlik

Providence-Attleboro Branch: J. P. Almeida, J. H. Andrews, W. Auclair

Rochester Branch: J. G. Hall

Saginaw Valley Branch: J. M. Gasper, A. Smith, B. L. Stuecker

St. Louis Branch: F. Feeherty

Syracuse Branch: R. S. Andrews, R. J. Hilgenberg A. M. Hoehn, G. M. Whitney, Jr.

Toledo Branch: William Whitaker

Toronto Branch: A. G. Spicer, C. A. Ward

Waterbury Branch: A. J. Maz

Member-at-Large: H. Whitefield

RESEARCH CHAIRMAN'S REPORT

INTRODUCTION

Research implies the critical and exhaustive investigation or experimentation having for its aim the discovery of new facts and their correct interpretation in the light of newly discovered evidence.

Since we can no longer rely on practical experience alone in the development of new plating and finshing processes, we must now turn our thoughts to the fundamentals involved if we are to advance in our field. From these fundamentals we can obtain a better understanding of that which has happened in the past. This, along with the basic knowledge gained, can then be utilized to improve and produce better processes and more useful and durable products.

The several activities of your AES Research Committee have continued at a sustained high rate during the past year. We now have eight research projects actively engaged in experimental research. Two projects are inactive at the present time due to the inability of finding suitable fellows to carry on the work. This brings the total number of projects to ten which is the largest number that the Research Committee has supervised for many years. This expanded program assures the membership of a continued and active program for the next few years. Table 1 shows in summary the projects now carrying on active experimental work under the AES research program.

PUBLICATIONS AND RESEARCH REPRINTS

During the past year eight research papers have been published in the various issues of PLATING. At the present time, four papers have been prepared and are to be presented at the Washington Convention. In addition to the printing of the research results in PLATING, your Committee has arranged for the binding, printing and distribution to sustaining members, copies of several reprints of research results.

The serial reprints published this year include—

XXXI — Effect of Surface Finishing of Nonferrous Base Metals on Protective Value of Plated Coatings.

XXXII — Effects of Impurities and Purification of Electroplating Solutions Part VII — Chromium Part VIII — Lead.

There are four other serial reprints in the process of being assembled. These reprints are available to members of the Society for a nominal fee. In addition to these publications, the sustaining members and others are now receiving the quarterly report of the Vice-Chairman, Research, on the status of the projects. In this way the members are assured of a continuous flow of research results.

PROPOSALS FOR RESEARCH AND TASK COMMITTEES

During the past year the Research Committee has investigated a number of detailed proposals for initiating research projects. In accordance with our usual policy, proposals for new projects as submitted by research organizations and/or members of the Society are reviewed and discussed in detail by special task force committees which are set up by your chairman. During the past year task committees have reported on—

1. The study of insoluble anodes.
2. Reflectance measurements and surface characterization.
3. Mechanical finishing of metal surfaces.

As a result of these task committee reports, a new Project 18, Mechanical Finishing of Metal Surfaces was activated and is now working.

PRESENT STATUS OF RESEARCH PROJECTS

PROJECT 2—Determination of Impurities in Electroplating Solutions.

Although active experimental work is not being conducted on this project, the general program of activities is continuing by compiling the plating process control handbook. The previous experimental work carried out under Project 2 will be included in the handbook. The results of the work carried out under the joint sponsorship of the Ohio River Valley Water Sanitation Commission and AES Project 2 are being published in PLATING.

PROJECT 5—Effect and Removal of Impurities in Plating Solutions.

During the past year the work on the effect and removal of aluminum and manganese as single impurities in nickel plating solutions has been completed. The results will be reported in papers to be presented at the Washington Convention. The investigation of calcium as a single impurity in nickel plating solutions is nearing completion. After the completion of work on calcium, an investigation of the effects of high and low levels of the combined impurities studied so far will be made. The original purpose of this project to determine the effects of single metal contaminants is nearing completion. Since plating baths in commercial operation contain varying amounts of all impurities, this investigation would not be complete without determining the results of plating baths containing a mixture of these impurities.

PROJECT 10 — Disposal of Plating Room Wastes.

This project is now studying the kinetics of the oxidation of cyanide and cyanate ions in solution. Work is now in progress to determine the factors involved in the oxidation of cyanide by the use of ozone. Indications are that the ozone-cyanide reaction is essentially diffusion controlled and equipment has been set up to study this phase of the work.

PROJECT 12—Cleaning and Preparation of Metals for Electroplating.

This project has been carrying out experimental work along two lines. It has been concerned with the effect of oxide films on the basis metal. The apparatus necessary to deposit a known controlled oxide film on metals and then plating over this film has been constructed. In this way more knowledge will be gained on the effects of the oxide film on the first layers of the deposit that forms. From results obtained by this method it is hoped that a clearer understanding of this mechanism will result. The first experiments are being conducted using copper as the basis metal and a Watts nickel plating solution as the plating bath. The other phase of this project has concerned itself with the relationship of oil spreading rate and the ease of cleaning. This relationship has been well established for oils that are liquid at room temperature. It has also been determined that solid materials at room temperature, when heated under controlled conditions will follow the same pattern. A relationship between different basis metals has also been established.

A summary on the atomizer test is being completed and will be available for publication in the near future.

PROJECT 13—The Nature, Cause and Effect of Porosity on Electrodeposits.

At the present time this project is inactive due to the inability of obtaining a fellow qualified to carry on the specialized work needed for this project.

The work done to date on the use of radioactive isotopes and X-ray to determine the pores in adherent plated deposits will be reported on at the Washington Convention.

PROJECT 14—The Effect of Basis Metal Condition on Plating.

The study of the effect of inclusions in the basis metal is being extended to include nine different types of steels. These steels include resulfurized screw stock and electrolytic iron, some of which has silica inclu-

TABLE I

SUMMARY OF AMERICAN ELECTROPLATERS' SOCIETY RESEARCH PROJECTS

PROJECT	LOCATION	PROJECT DIRECTOR	COMMITTEE CHAIRMAN	FELLOW	SUBJECT	STATUS
2	Lehigh	Dr. E. J. Serfass		None needed	Plating Process Control Handbook	Active
5	Michigan State	Dr. A. J. Smith	L. C. Borchert	R. J. Rowe R. Bacon	Effect and Removal of Impurities in Nickel Solutions	Active
10	Yale	Dr. B. Dodge	L. Durney	N. E. Sondak	Disposal of Plating Room Wastes	Active
12	Columbia	Dr. H. B. Linford	E. T. Candee	D. Feder R. Simon	Cleaning—Oxide Effects; Oil Spreading Studies	Active
13	Bureau of Standards	F. Ogburn	C. Sample	Open	Nature, Cause and Effect of Porosity in Electrodeposits	Inactive
14	Ontario Research Foundation	Dr. N. H. Jones	W. Tucker	J. Zajdowski	Effect of Basis Metal Condition on Plating	Active
15	Detroit Area	None	W. L. Pinner	None needed	Accelerated Corrosion Tests	Active
16	University of Pennsylvania	Dr. B. E. Conway	E. Bowerman	Dr. W. Mehl	Mechanism of Electrodeposition	Active
17	Virginia Institute for Scientific Research	Dr. H. Leidheiser	Dr. W. Meyer	Open	Microthrowing Power	Inactive
18	Chicago Area	None	C. E. Kennedy		Mechanical Finishing of Metal Surfaces	Active

sions. It appears that the structure of the nickel deposit is different over the inclusions. Small inclusions have a tendency to bridge over with 0.4 mil of nickel, while the larger inclusions remain uncovered by 1.5 mil and show instant corrosion failure under test. It is thought that the nickel thickness using a Watts nickel should be 1.5 to 2.0 times the inclusion diameter to cover it over but it still will result in a pit.

During the past year this project published the Critical Review of the Literature, Correlated Abstracts and Bibliography on the Effects of Basis Metal Condition on Plating in the AES publication PLATING.

PROJECT 15—Accelerated Corrosion Tests.

The elimination process has narrowed down the number of accelerated corrosion tests from the original twenty-two to two. Most of the activity of the project has been centered around the Corrodkote (Test 20) and the acetic acid salt spray (Test 14). Both of these tests are being investigated with the use of standard panels. The Corrodkote test employs the use of a corrosion producing medium applied to the plated surface, after which it is subjected to a humid atmosphere. The acetic acid salt spray employs conventional salt spray equipment using acetic acid in conjunction with the salt solution. A complete progress report of the work done during the past year will be given by Project 15 at the Washington Convention.

PROJECT 16 — Mechanism of Electrodeposition.

This is a new project being carried out at the University of Pennsylvania. The committee has held several meetings under the chairmanship of E. Bowerman. The purpose of this project is to investigate the fundamentals of electrodeposition. This will include polarization, overvoltage and other cathode reaction mechanisms. A literature review is now being prepared. Work is beginning on copper electrolytes. Special attention is being paid to the purification of materials, since this has a great influence on the measurements which will be made. After studying copper, other electrolytes having different polarization characteristics will be included.

PROJECT 17—Microthrowing Power.

Work on this project which was authorized this year has not yet started due to the inability to find a suitable fellow. Efforts are being made to obtain the services of someone who can carry out the work intended.

PROJECT 18—Mechanical Finishing of Metal Surfaces.

This is a new project recently activated under the direction of the Chicago Electroplaters Institute on a cooperative basis, similar to that of Project 15. A review of the literature and the work done on Project 4 is being carried out. The first work will be to develop the equipment necessary to obtain consistent results in studies involving the buffing of zinc base die castings. No carefully laid out program will be attempted until these preliminary exploratory tests have been made.

MEMBERSHIP AND FINANCES

Your Chairman is pleased to report that the number of sustaining members now stands at 341. This is an increase of 31 members during the past year. This brings the total sustaining memberships to 371.

The credit for this increase is due to the continuing efforts of the Vice-Chairman, Finance, who has set up an efficient finance organization. Through this organization's efforts the sustaining memberships are now the highest in the history of the AES Research Committee.

The financial status of the research program is a healthy one. Due to the increased activity of the Projects the increase in excess of income over expenses has been held at about the same as that of last year. This is a good condition. Reference to the Auditors' Report indicates that a research balance as of March 31, 1956 is now about $105,212.75. Although this is the highest research fund balance in the history of the Society, we feel that this reserve fund is adequate assurance to continue the research program for a period of two years. It has been the objective of the Research Committee to maintain a reserve fund of such magnitude as to permit continuation of research for a minimum of two years, which is necessary in order to insure adequately the renewal of research projects now in progress. During this coming year the activation of the new projects will be reflected in a greater expenditure as they progress. The new budget will consume approximately $45,000 which should about equal the income of the Research Fund even with the new memberships added.

CONCLUSION

Since the beginning of the AES Research Program a vast amount of data and scientific facts have been gathered together and have been published. Since close cooperation between the highly trained research man and the practical operator or engineer is required for effective industrial progress, your Research Committee feels that this data should be assembled and combined in such a form that it can readily be used. Your Research Committee is attempting to do this by summarizing the work of each project, giving only the pertinent facts so the results of the research work can be used and distributed to a broader field.

Also during the past year a historical summary of the Research Committee beginning after World War II has been compiled.

* * * * * *

In closing this report your Chairman wishes to thank the members who have served on the Research Committee and those that have served in the capacities of Vice-Chairman, District Supervisors, Chairman and Committee Members along with the Directors and Fellows on the projects who have made the operation of this group a success.

Last but not least, thanks are extended to the sustaining members whose contributions and faith in the Research Program have made it possible to carry on the work of AES Research.

L. C. Borchert
Chairman, Research Board

April 11, 1956

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Arthur Wrisberg, St. Louis, Kansas City, Colorado and Southwestern Branches

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G. E. Best, *AES Representative to ASTM Committee D-19;* Mutual Chemical Company of America
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Archimedes Doria, *Editor*
H. George Burnley, *Advertising Manager*
Robert F. Buehler, *Assistant Advertising Manager*
Richard E. Huntley, *Production Manager*
Ann M. Panico, *Editorial Assistant*

AMERICAN ELECTROPLATERS' SOCIETY
445 BROAD STREET
NEWARK 2, NEW JERSEY

We have examined the balance sheets of the General Fund and Research Fund of American Electroplaters' Society, Incorporated (New Jersey Corporation) as of March 31, 1956, and the related statements of income and funds for the year ended. Our examination was made in accordance with generally accepted auditing standards and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

The accompanying balance sheets and statements of income are exclusive of certain accounts described in the notes appended thereto.

In our opinion, the accompanying balance sheets and statements of income, except as indicated, present fairly the financial position of American Electroplaters' Society, Incorporated at March 31, 1956, and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Newark, N. J.
April 18, 1956

CLYDE A. ZUKSWERT & CO.
Certified Public Accountants

FINANCIAL STATEMENT OF THE SUPREME SOCIETY OF THE AMERICAN ELECTROPLATERS' SOCIETY, INC.

General Fund — Comparative Balance Sheet — March 31, 1956 and 1955

ASSETS	*"Society"*	*"Plating"*	*Total 1956*	*1955*	*Increase Decrease**
CURRENT ASSETS:					
Demand deposits	$ 9,934.15	$24,441.59	$ 34,375.74	$ 53,349.18	$18,973.44*
Time deposits	120,000.00		120,000.00	130,000.00	10,000.00*
Petty Cash	50.00		50.00	50.00	
United States Treasury bonds:					
Series K	9,690.00		9,690.00	9,690.00	
3¼%, 6-15-83/78 (at cost)	15,682.20		15,682.20	15,682.20	
ACCOUNTS RECEIVABLE:					
Advertising, books, reprints	543.63	6,255.14	6,798.77	3,835.13	2,963.64
Advances, Convention	2,500.00		2,500.00	336.14	2,163.86
Other		76.68	76.68	75.00	1.68
Total accounts receivable	$ 3,043.63	$ 6,331.82	$ 9,375.45	$ 4,246.27	$ 5,129.18
Total current assets	$158,399.98	$30,773.41	$189,173.39	$213,017.65	$23,844.26*
DEPOSITS:					
American Airlines	$ 425.00	$	$ 425.00	$ 425.00	$
Prepaid postage	109.09	67.67	176.76	354.77	178.01*
Copyright office				48.00	48.00*
Total deposits	$ 534.09	$ 67.67	$ 601.76	$ 827.77	$ 226.01*
"PLATING" Investment Account (contra)				$ 30,000.00	$30,000.00*
DEFERRED CHARGES:					
Process control handbook	$	$	$	$ 1,800.00	$ 1,800.00*
Heussner medals	79.20		79.20	80.90	1.70*
Total deferred charges	$ 79.20		$ 79.20	$ 1,880.90	$ 1,801.70*
Carl E. Heussner Award Fund	$ 3,000.00		$ 3,000.00	$ 3,000.00	
TOTAL ASSETS	$162,013.27	$30,841.08	$192,854.35	$248,726.32	$55,871.97*
LIABILITIES AND FUND					
CURRENT LIABILITIES:	$ 532.59	$ 512.17	$ 1,044.76	$ 853.35	$ 191.41
Hospital plan	11.84	4.38	16.22		16.22
Foreign advances	23.57		23.57	23.57	
Excise Tax	6.60		6.60		6.60
Exchange	3.69	10.30	13.99		13.99
Advances, Cleveland I.F.E.				32,247.88	32,247.88*
TOTAL CURRENT LIABILITIES	$ 578.29	$ 526.85	$ 1,105.14	$ 33,124.80	$32,019.60*
"PLATING" Investment Account (contra)				$ 30,000.00	$30,000.00*
Carl E. Heussner Award Fund	$ 3,170.91		$ 3,170.91	$ 3,136.06	$ 34.85
General Fund, Exhibit C	158,264.07	30,314.23	188,578.30	182,465.46	6,112.84
TOTAL LIABILITIES AND FUND	$162,013.27	$30,841.08	$192,854.35	$248,726.32	$55,871.97*

AMERICAN ELECTROPLATERS' SOCIETY INCORPORATED

(New Jersey Corporation)

EXHIBIT B

COMPARATIVE STATEMENT OF INCOME
GENERAL FUND — "SOCIETY" CONTROL
For the years ended March 31, 1956 and 1955

	Year Ended March 31		Increase Decrease*
	1956	*1955*	
INCOME:			
SALES:			
"Proceedings"	$ 1,696.06	$ 1,425.90	$ 270.16
Books and reprints	6,278.67	20.00	6,258.67
Glasstone book	222.19	57.22	164.97
Branch supplies	144.86	516.06	371.20*
Total Sales	$ 8,341.78	$ 2,019.18	$6,322.60
Per capita tax (Pro rata share)	17,514.16	16,705.84	808.32
Member-at-large dues (Pro rata share)	1,165.01	1,009.31	155.70
Sustaining membership dues (Pro rata share)	943.65	1,815.85	872.20*
Interest on investments	5,600.22	3,367.66	2,232.56
Miscellaneous income	1,211.54	371.24	840.30
Total income	34,776.36	25,289.08	9,487.28
EXPENSES:			
"Proceedings" expense	14,795.24	14,575.86	219.38
Cost of index	175.00		175.00
Copyright expense	4.00		4.00
Books and reprints purchased	4,731.82		4,731.82
Glasstone book royalties		7.20	7.20*
Process control handbook	1,050.00		1,050.00
Branch supplies	132.04	292.35	160.31*
Salaries (Pro rata share)	12,983.47	11,102.68	1,880.79
Traveling expense (Pro rata share):			
Executive secretary	1,626.26	1,363.07	
Officers	1,898.02	1,470.41	427.61
Officers' office expense	87.71	39.84	47.87
Furniture, fixtures and office equipment (Pro rata share)	854.60	599.22	255.38
Furniture and fixtures repairs (Pro rata share)	200.75	55.26	145.49
Alterations and repairs—Office (Pro rata share)		228.38	228.38*
Headquarters' office expense (Pro rata share)	4,116.30	4,398.16	281.86*
Public relations (including branch officers' manual)	5,252.85	4,764.03	488.82
Miscellaneous branch expense	701.14	625.95	75.19
Bad debts	3.95		3.95
	$48,613.15	$39,522.41	$9,090.74
EXCESS OF EXPENSES OVER INCOME	$13,836.79	$14,233.33	$ 396.43*

EXHIBIT C

STATEMENT OF GENERAL FUND ACCOUNT
For the year ended March 31, 1956

	"Society"	*"Plating"*	*Total*
BALANCE, APRIL 1, 1955	$127,517.55	$54,947.91	$182,465.46
ADD:			
Income from Cleveland Industrial Finishing Exposition, Cleveland	17,383.31		17,383.31
Excess of income over expenses per Exhibit D		5,366.32	5,366.32
Transfer from "Plating" control	30,000.00		30,000.00
Total	$174,900.86	$60,314.23	$235,215.09
DEDUCT:			
Process control handbook charges from preceding year	$ 1,800.00		$ 1,800.00
Grant to United Engineering Foundation for corrosion research	1,000.00		1,000.00
Excess of expenses over income per Exhibit B	13,836.79		13,836.79
Transfer to Society control		30,000.00	30,000.00
Total Deductions	$ 16,636.79	$30,000.00	$ 46,636.79
BALANCE, MARCH 31, 1956	$158,264.07	$30,314.23	$188,578.30

SUMMARY:			*Total*
Total income	34,776.36	168,382.47	203,158.83
Total expenses	48,613.15	163,016.15	211,629.30
Net (Deficit) or income transferred to General Fund	(13,836.79)	5,366.32	(8,470.47)

EXHIBIT D

AMERICAN ELECTROPLATERS' SOCIETY INCORPORATED

(New Jersey Corporation)

COMPARATIVE STATEMENT OF INCOME
GENERAL FUND — "PLATING" CONTROL
For the years ended March 31, 1956 and 1955

	Year Ended March 31 1956	1955	Increase Decrease*
INCOME:			
Advertising (except classified)	$170,193.77	$158,779.35	$ 11,414.42
Less:			
Discounts allowed	2,567.69	2,524.06	43.26
Agency commissions	21,559.86	20,823.78	736.08
Total	$ 24,127.55	$ 23,347.84	$ 779.71
Net	$146,066.22	$135,431.51	$ 10,634.71
Sales:			
Monthly publication	6,013.79	5,028.54	985.25
Reprints	1,946.23	3,009.07	1,062.84*
Classified advertising	299.00	51.50	247.50
Miscellaneous		1,126.40	1,126.40*
Per capita tax (Pro rata share)	12,975.89	12,418.97	556.92
Member-at-large dues (Pro rata share)	382.34	343.96	38.38
Sustaining membership (Pro rata share)	699.00	1,344.90	645.90*
Interest on investments		251.04	251.04*
Total Income	$168,382.47	$159,005.89	$ 9,376.58
EXPENSES:			
Monthly publication expense:			
Printing costs	$ 76,584.03	$ 61,194.47	$ 15,389.56
Other costs	7,957.77	5,767.61	2,190.16
Promotional advertising expense	2,366.37	1,635.60	730.77
Commissions:			
Advertising Manager and Assistant	1,680.49	770.09	910.40
Previous advertising manager		2,441.86	2,441.86*
Salaries: (Pro rata share)	48,863.67	38,174.71	10,688.96
Furniture, fixtures and office equipment (Pro rata share)	1,596.07	1,840.32	244.25*
Furniture and fixtures repairs (Pro rata share)	159.59	43.98	115.61
Alterations and repairs—Office (Pro rata share)		269.00	269.00*
Traveling expense (including meetings expense)			
Officers (Pro rata share)	1,672.34	1,443.62	228.72
Managing editor (Pro rata share)	332.76	346.19	13.43*
Editor	705.89	638.61	67.28
Production manager	247.36	177.68	69.68
Advertising Dept.	5,889.10	2,530.02	3,359.08
Headquarters' office expense (Pro rata share)	13,157.06	9,297.08	3,859.98
Copyright expense	48.00	44.00	4.00
Reprint purchases	1,500.80	2,062.03	561.23*
Bad debts	254.85		254.85
Total expenses (Note)	$163,016.15	$128,676.87	$ 34,339.28
EXCESS OF INCOME OVER EXPENSES	$ 5,366.32	$ 30,329.02	$ 24,962.70*

EXHIBIT E

COMPARATIVE BALANCE SHEET — RESEARCH FUND
March 31, 1956 and 1955

	Year Ended March 31 1956	1955	Increase Decrease*
ASSETS			
CURRENT ASSETS:			
Demand deposit	$ 21,185.45	$22,572.82	$ 1,387.37*
Time deposits, Schedule 1	84,000.00	67,000.00	17,000.00
Accounts receivable	27.30	26.40	.90
Total assets	$105,212.75	$89,599.22	$15,613.53
LIABILITIES AND FUNDS			
CURRENT LIABILITIES:			
Payroll tax deductions	$	$ 61.00	$ 61.00*
RESEARCH FUND PER EXHIBIT G	105,212.75	89,538.22	15,674.53
Total liabilities and fund	$105,212.75	$89,599.22	$15,613.53

EXHIBIT F

AMERICAN ELECTROPLATERS' SOCIETY INCORPORATED

(New Jersey Corporation)

COMPARATIVE STATEMENT OF INCOME — RESEARCH FUND

For the years ended March 31, 1956 and 1955

INCOME:			
Sustaining membership dues and subscriptions (Pro rata share)	$ 33,308.10	$30,039.25	$ 3,268.85
Per capita tax (Pro rata share)	6,487.95	6,209.48	278.47
Member-at-large dues (Pro rata share)	191.23	172.11	19.12
Sale of reprints	717.91	593.71	124.20
Interest on investments	2,467.50	1,287.53	1,179.97
Miscellaneous income		408.61	408.61*
Total income	$ 43,172.69	$38,710.69	$ 4,462.00
EXPENSES:			
Transfer to Canadian Research Fund	$ 3,864.09	$ 3,936.29	$ 72.20*
Project payments to institutions	11,100.00	6,200.00	4,900.00
Project directors and associates	9,531.93	11,692.54	2,160.61*
Reprints purchased	1,030.73	1,530.44	499.71*
Supplies	831.66	419.69	411.97
Social security tax	66.06	73.73	7.67*
Sustaining membership promotion	351.95		351.95
Traveling expense (including meetings expense)	107.72	43.62	64.10
Bad debts	9.85		9.85
Miscellaneous expense	604.17	285.77	318.40
Total expenses	$ 27,498.16	$24,182.08	$ 3,316.08
EXCESS OF INCOME OVER EXPENSES	$ 15,674.53	$14,528.61	$ 1,145.92

STATEMENT OF RESEARCH FUND ACCOUNT

For the year ended March 31, 1956

BALANCE, APRIL 1, 1955	$ 89,538.22
ADD:	
Excess of income over expenses for the year ended March 31, 1956, per Exhibit F	15,674.53
BALANCE, MARCH 31, 1956	$105,212.75

EXHIBIT G

COMPARATIVE STATEMENT OF RECEIPTS AND DISBURSEMENTS CANADIAN RESEARCH FUND

For the years ended March 31, 1956 and 1955

	Year Ended March 31		
	1956	*1955*	*Increase Decrease**
BALANCE, APRIL 1 (THE DOMINION BANK, TORONTO, CANADA)	$ 2,120.58	$ 1,975.05	$ 145.53
RECEIPTS:			
American Electroplaters' Society, Research Fund	$ 3,864.09	$ 3,936.29	$ 72.20*
Toronto Branch		151.00	151.00*
Western Ontario Branch		100.00	100.00*
Sustaining Membership dues	2,000.00	1,825.00	175.00
Interest	12.19	26.80	14.61*
Total receipts	$ 5,876.28	$ 6,039.09	$ 162.81*
Total	$ 7,996.86	$ 8,014.14	$ 17.28*
DISBURSEMENTS			
Ontario Research Foundation	$ 6,000.00	$ 5,745.00	$ 255.00
Discount and exchange	8.31	148.56	140.25*
Total disbursements	$ 6,008.31	$ 5,893.56	$ 114.75
BALANCE, MARCH 31, (THE DOMINION BANK, TORONTO, CANADA)	$ 1,988.55	$ 2,120.58	$ 132.03*

SUSTAINING MEMBERSHIPS 1955-1956

UNITED STATES

Accurate Elec.-Plat., Inc. (Phil)
Acid Products Co., Inc. (Chic)
Acme Galvanizing, Inc. (Milw)
Acme Plating Co. (Clev)
Acme Steel Co. (Chic)
Adolph Plating, Inc. (Chic)
Advance Plating Co. (Clev)
Advance Plating Co.
Subs. Alum., Ind., Inc. (Det)
Aetna Electro. Co., Inc. (Phil)
Alco Chemical Inc. (Det)
Alert Supply Co. (L.A.)
All-Brite Chemical Co. (Wtby)
Allen-Bradley Co. (Milw)
Allied Ind. Prod., Inc. (Chic)
Allied Res. Prod., Inc. (Bal-W)
Allis-Chalmers Mfg. Co. (Milw)
Alum. Co. of America (Pitt)
Amer. Anodizing Corp. (Bos)
American Brass Co., (Wtby)
American Buff Co. (Chic)
Amer. Cab. Hard. Corp. (Chic)
American Can Co. (Chic)
Amer. Chem. Paint Co. (Phil)
Amer. Elec. Prod., Inc. (Wtby)
Amer. Instrument Co. (Bal-W)
Amer. Nickeloid Co. (Chic)
American Phenolic Corp. (Chic)
Amer. R. & S. San., Corp. (Lvlle)
Amer. Smelt. & Ref. Co. (Nwk)
Amer. Wire Fab., Corp. (Lanc)
Amer. Zinc Inst. (5) (N.Y.)
Amer. Zinc Sales Co. (St. L)
Apex Plating Co. (Chic)
Apollo Metal Works (2) (Chic)
Arkansas Metals Co. (Chic)
Ardco, Inc. (Chic)
Arrow-Hart & Hegeman Elec. (Htf)
Arrow Plat. Co., Inc. (Chic)
Arted Chrome Plat. Co. (Det)
Arvin Indus., Inc. (Indpls)
Asso. Plating Co. (L.A.)
Atlas Plating Works (Chic)
Atlas Pdr. Co. Darco-Sls (Bal-W)
Auto City Plat. Co. (Detr)
Automotive Rub. Co. (Detr)
Autotyre Co., Inc. (Wtby)

M. E. Baker Co. (Bost)
Barker-Webb Co., Inc. (L.A.)
Bart Lab. Co., Inc. (Nwk)
Bart-Messing Corp. (Nwk)
Bastian-Blessing Co. (Chic)
Beacon Sup. Co. (Bost)
Belke Mfg. Co. (Chic)
Bell & Howell Co. (Chic)
Bell Tele. Lab., Inc. (Nwk)
Bendix
Bendix Avia. Corp., (St. Jo)
Berteau-Lowell Plat. Wks. (Chic)
Bethlehem Steel Co. (2) Al-Rd)
Big Ben Petro. Prod. (Chic)
Blakeslee, G. S. & Co. (Chic)
Bruce Products Corp. (Detr)
Buckeye Products Co. (Cinc)
Buckingham Prod. Co. (Detr)
L. H. Butcher Co. (L.A.)

Chandeysson Elec. Co. (St. L)
Chase Brass & Copper Co. (Wtby)
Chemical Corp. (Spfd)
Chic. Elec. Plat. Inst. (Chic)
Chicago Roller Skate Co. (Chic)
Chi. Thrift-Etch. Corp. (Chic)
Christie Plating Co. (N.H.)
Chromium Corp. of Amer. (N.Y.)
Chromium Proc. Co (N.H.)
Chrysler Corp. (2) (Detr)
Clevite Brush Develop. Co. Div. of Clevite Corp. (Clev)
Clinton Co. (Chic)
Codman, F. L. & J. C. Co. (Bos)
Continen. Can Co., Inc. (Wich)
Corona Corp., (Nwk)
Cowles Chem. Co. (Clev)
Crane Co. (Chic)
Crane Equip. & Sup. Co. (Wtby)
Croname, Inc. (Chic)
Crown City Plat. Co. (L.A.)
Crown Cork & Seal Co. (Bal-W)
Crown Rheo. & Sup. Co. (Chic)
Cutler-Hammer Co. (Milw)

Davies Sup. & Mfg. Co. (St. L.)
Dayton Rust Proof Co. (Day)
Dexter Ind., Inc. (Gr R)
Diamond Alkali Co. (Clev)
Diversey Corp. (Chic)
Dixie Electro Plat. Co. (Hstn)
Doehler-Jarvis Corp. (Gr R)
Donald Sales & Mfg. Co. (Milw)
R. R. Donnelley & Sons (Chic)

E.LduPont deNemours & Co., Inc. (B)
Duro-Chrome of Chi. Inc. (Chic)
Eastern Electro. Co. (Wtby)
Eastman Kodak Co. (2) (Roch)
Eaton Mfg. Co. (Clev)
Ekco Products Co. (Chic)
Elec. Auto-Lite (2) (Tldo)
Electro Glo Co. (Chic)
Electrolux Corp. (Bdpt)
Enthone, Inc. (N.H.)
Felt & Tarrant Mfg. Co. (Chic)
Finishing Publications, Inc. (Nwk)
Folding Carrier Corp. (St. L.)
Ford Motor Co. (5) (Detr)
Formax Mfg. Co. (Detr)
Frigidaire Div.

General Motors Corp. (Dayt)
P. B. Gast Co. (Gr R)
General American Trans. Corp. Kanigen Division, (Chic)
General Electric Co. (Cap Dist)
General Motors Corp. (5) Research Lab. Div. (Detr)
General Plating Co. (Phil)
Gerity-Michigan (Detr)
Gorham Mfg. Co. (Prov-A)
Graham, Crowley & Assn. (Phil)
Graham Plating Work (Chic)
L. F. Grammes & Sons, Inc. (Al-Rd)
G. R. Plating Co., Inc. (Gr R)
Grand Steel & Mfg. Co. (Detr)
Great Lakes Ind., Inc. (Chic)
Gumm, Fred., Chem. Co. (Nwk)

C. Hager & Sons Hinge Mfg. Co. (St. L)
Hall-Mack Co. (L.A)
Hamilton Watch Co. (Lanc)
Hammond Mach. Bldrs., Inc. (Gr R)
Hanson-Van Winkle-Munning Co. (3) (Nwk)
Harding Mfg. Co. (Detr)
Harlan Electric Co. (Detr)
Harper-Leader, Inc. (Wtby)
Hardwood Line Mfg. Co. (Chic)
Harshaw Chem. Co. (3) (Clev)
Haviland Prod., Co. (G.R.)
Heil Proc. Equip. Corp. (Clev)
Higgins Rack Coat & Mfg. (Det)
Houdaille Indus., Inc. (3) (Detr)
Howard Plat. Ind., Inc. (Detr)
Hudson Eng. & Res. American Mtrs. Corp. (Detr)
R. O. Hull & Co., Inc. (Clev)
Hy-Grade Elecplat. Co. (Nwk)

Ind. Filter & Pump Mfg. (Chic)
Industrial Stamping & Mfg. Co. Division of Vinco Corp. (Detr)
Int'l Bus. Mach. Corp. (S.Tier)
Int'l Nickel Co., Inc. (5) (NY)
Int'l Silver Co. (Wtby)

James Plating Wks., Inc. (Chic)
Jervis Corp. (Gr R)

Kaybar, Inc. (Detr)
Kaynide Div., Kraft Chem. Co. (Chic)
Keeler Brass Co. Mich. (Gr R)
Kelite Products, Inc. (Chic)
Kelly Plating Co. (Clev)
Knape & Vogt Mfg. Co. (Gr R)
Knapp-Monarch Co. (St. L.)
Knight Plating Co. (Detr)
Kocour Co. (Chic)
Kohler Co. (Milw)

Lane Plating Wks. (Ia-Ft W)
Lasalco, Inc. (St. L)
R. Lavin and Sons, Inc. (Chic)
Lea Mfg. Co. (Wtby) (L.I.C.) (N.Y.) (2)
Leeds & Northrup Co. (Phil)
Leveo Metal Fin., Inc. (N.Y.)
C. F. L'Hommedieu & Sons (Chi)
Line Material Co. (Milw)
Lorence Plating Co. (Clev)
Lyon, Inc. (Detr)

Maas & Waldstein Co. (Nwk)
W.D. MacDermid Chem. (Wtby)
MacDermid, Inc. (Wtby)
Magnuson Products Corp. (NY)
R. C. Mahoney (Detr)
P. R. Mallory & Co., Inc (Ind) (Detr)
Manderscheid Co. (Chic)
Master Platers' Inc. (Det)
Matchless Metal Polish Co. (Chi)
Mattatuck Mfg. Co. (Wtby)
Maurer Supply Co. (St. L.)
McGean Chemical Co. (Clev)
Meaker Co. (Chic)
Mechanical Plating Co. (Chic)
Mefford Chem. Co. (L.A.)

Mercil Pltg. Equip Co. (Chic)
B. Mercil & Sons Pltg. Co. (Chi)
Metalcraft Corp. (Chic)
Metal Mouldings Corp. (Detr)
Metal Plating Corp. (Detr)
Metal Process. Co. (Chic)
Metal & Thermit Corp (2) (NY)
Metal & Thermit Corp. United Chromium Div. (Detr)
Mich. Bumper Corp. (Gr R)
Mich. Chrome & Chem. Co. (Det)
Midwest Chrome Proc. Co. (Det)
J. C. Miller Co. Div. of H-V W-M Co. (Gr. R)
Millhorn Chem. Sup. Co. (L.A.)
Milw. Plating Co. (Milw)
Minn-Honey. Reg. Co. (TwCty)
Mitchell-Bradford Chem. (Bdpt)
Modern Plating Co. (L.A.)
Modern Plating Co. (Chic)
Modern Plating Corp. (Chic)
Moore Drop Forg. Co. (Spfd)
Motor Prod. Corp. (Detr)
Mutual Chemical Div. Allied Chem. and Dye Corp. (N.Y.)

George L. Nankervis Co. (Detr)
National Aniline Div., Allied Chem. and Dye Corp. (N.Y.)
National Cash Reg. Co. (Dayt)
National Lock Co. (Rock)
National Rejectors, Inc. (St. L.)
Nat. Screw & Mfg. Co. (Clev)
New Eng. Plat. Co., Inc. (Htfd)
N. J. Zinc Co. of Pa. (3) (A-R)
George E. Nichols Plat. (L.A.)
G. J. Nikolas & Co., Inc. (Chic)
No. Amer. Aviation, Inc. (L.A.)
Northwest Chem. Co. (Detr)
Northwestern Plating Wks. (Chic)
Nutmeg Chrome Corp. (Htfd)

Oakite Products, Inc. (N.Y.)
Oakman Plating Co. (Detr)
Oneida, Ltd. (Syr)
John Oster Mfg. Co. (Milw)

F. D. Pace Co. (Gr R)
Packard Motor Car Co. (Detr)
Pan Ormond Corp. (SE)
Parker Pen Co. (Milw)
Penna. Salt Mfg. Co. (Phil)
Perlick Brass Co. (Milw)
Perma Line Rub. Prods. Corp. (Chic)
Phila. Rust-Proof Co. (Phil)
Philco Corp. (Phil)
Platers Supply Co. (Clev)
Platers Tech. Ser., Inc. (Chic)
Plating Engineering Co. (Mil)
Plating Service Co. (Chic)
Precision Cast. Co. Mich (Gr R)
Preston Products Co. (Gr R)
Price-Pfister Brass Mfg. Co. (L.A.)
Products' Finishing (Cinc)
Production Plating Co. (S.E.)
Progress Mfg. Co., Inc. (Phil)
Promat Div. Poor & Co. (Chic)

Racine Plating Co., Inc. (Milw)
Radio Corp of America (Phil)
Rawac Plating Co. (Dayt)
Reed Plating Co. (Detr)
Reilly Plating Co. (Detr)
Reliable Plating Co. (Chic)
Reliable Plat. Rack Co. (Chic)
R. W. Renton & Co. (Clev)
Republic Steel Corp. (Clev)
Reynolds Co. (Phil)
Richardson-Allen Corp. (N.Y.)
Roberts Rouge Co. (Bdpt)
G. S. Robins & Co. (St. L)
Roth Plating Corp. (St. Jo)
Roto-Finish Co. (Gr R)
Royal Plat. & Pol., Co., Inc. (Nwk)
Royal Typewriter Co. Div. of Royal McBee Corp. (Htfd)

Scientific Control Lab. (Chic)
Scovil Mfg. Co. (Wtby)
J. P. Seeburg Corp. (Chic)
E. E. Seeley Co., Inc. (Bdpt)
Sel-Rex Prec. Metals, Inc. (Nwk)
Seymour Mfg. Co. (Wtby)
J. J. Siefen Co. (Detr)
Smoothex, Inc. (Clev)
Solventol Chem. Prods., Inc (Detr)
Sommers Bros., Mfg. Co. (St.L.)
Sparkler Mfg. Co. (Chic)
C. D. Sparling Co. (Detr)
Spence Elec. Plat. Co. (L.A.)
Sprague Electric Co. (Cap. D)
Standard Nickel-Chromium Plating Co. (L.A.)
Standard Plat. Rack Co. (Chic)
Standard Plat. Wks., (St. J)
Standard Steel Spring Div. Rockwell Spring & Axel Co. (3) (Pitt)
Stanley Works, The (Htfd)
Steel Heddle Mfg. Co. (Phil)
Stevens, Frederic B., Inc (2) (Detr)
Stromberg-Carlson Co. Div. Gen'l Dynamics Corp. (Roch)
Studebaker Corp. (St. Jo)
George A. Stutz Mfg. Co. (Chic)
Summit Fin. Co., Inc. (Wtby)
Sunbeam Corp. (Chic)
Sundmark Supply Co. (L.A.)
Superior Steel Corp. (Detr)
Surface Alloys, Inc. (L.A.)
Sylvania Elec. Prods., Inc. (NY)

Talon, Inc. (Clev)
Ther Elec. & Mach. Wks. (Chic)
Thomas Strip Div. Pittsburgh Steel Co. (Clev)
Time Chemical, Inc. (Chic)
Turco Products, Inc. (L.A.)

Udylite Corporation, (Detr)
United-Carr Fast. Corp. (Bost)
United Mfg. Co. (Chic)
United Platers, Inc. (Detr)
U. S. Spring & Bumper Co. Calif. (L.A.)

Van Der Horst Corp. of Amer. (Bflo)
Victor Casket Hard. Co. (MisV)
Virtue Bros. Mfg. Co. (L.A.)

A. T. Wagner Co. (Detr)
Wagner Bros., Inc. (Detr)
Walton & Lonsbury (Prov-A)
Waterbury Companies (Wtby)
Waterbury Plating Co. (Wtby)
Wierton Steel Co. (Pitt)
Western Elec. Co., Inc. (Chic)
Western Rust Proof Co. (Chic)
Westinghouse Elec. Corp. (Pitt)
Whitfield Chemicals (Detr)
Whyco Chrom. Co., Inc. (Wtby)
Edwin L. Wiegand Co. (Pitt)
S. K. Williams Co. (Milw)
Winchester Repeat. Arms Co. Conn. (N.H.)
Wollensak Optical Co. (Roch)
Wyandotte Chem. Corp. (Detr)

Yankee Mtl. Prod., Corp. (Bdp)

CANADA

Alloycraft, Ltd. (Mont)
Armalite Company, Ltd. (Tor)

Behr-Manning (Canada), Ltd. (Ham)
Bendix-Eclipse of Canada Ltd. (W Ont)
Bomac Electrotype Co., Ltd. (Tor)

Canada Cycle & Mo. Co., Ltd. (Tor)
Canadian Motor Lamp Co., Ltd. (W Ont)

Dom. Found. & Steel, Ltd. (Ham)

Gen. Motors of Can., Ltd. (W Ont)

Can. Hanson & Van Winkle Co., Ltd. (Tor)
Houdaille-Hershey of Can., Ltd. (Tor)

Int'l Nickel Co. of Canada (Tor)

Lea Mfg. Co. of Can. (Tor)

Northern Elec. Co., Ltd., (Mont)

Ontario Steel Prod. Co., Ltd. (W Ont)

Steel Co. of Can., Ltd. (Ham)

Union Screen Plate Co. of Can., Ltd. (Mont)
United Chromium, Ltd. (Tor)

W. W. Wells, Ltd. (Tor)
Westinghouse Corp. of Can., Ltd. (Ham)

CHECK THESE PRICES

for General Electric Air-cooled Germanium Platers

6 volts, 1500 amps . .	$1565.00
12 volts, 1000 amps . .	$1616.00
12 volts, 2000 amps . .	$2465.00

NOW EVERY PLATING SHOP can take advantage of the long life and operating savings of germanium with:

1 **THE UNIQUE G-E TRUE HERMETICALLY SEALED GERMANIUM CELL**—that safeguards the germanium from corrosive atmosphere.

2 **THE UNIQUE G-E GERMANIUM PROTECTIVE SYSTEM**—the first protective device designed specially to help safeguard the germanium cell against all types of overloads. Provides an original advance-warning feature to help prevent costly, sudden shutdowns.

3 **GENERAL ELECTRIC EXPERIENCE IN GERMANIUM**—over 13,000 kilowatts (2,000,000 amperes at plating voltages) of germanium rectifiers installed and operating. General Electric Co., Schenectady 5, N. Y. 463-14

GENERAL ELECTRIC

Prices refer to integral tap switch unit shown here.

CALL YOUR AUTHORIZED GENERAL ELECTRIC PLATING AGENT TODAY.

M. E. BAKER CO., Cambridge, Mass.
BELKE MFG. CO., Chicago, Ill.
THE CHEMICAL CORP., Springfield, Mass.
CLEVELAND ELECTRIC CO., Atlanta, Ga.
FITZPATRICK ELECTRIC SUPPLY CO., Muskegon, Mich.
COMCO, INC., New Haven, Conn.
W. M. FOTHERINGHAM CO., Buffalo, N. Y.
GENERAL ELECTRIC SUPPLY CO., Cleveland, Ohio
FRED GUMM CHEMICAL CO., Kearny, N. J.
LASALCO, INC., St. Louis, Mo.
LEA MANUFACTURING CO., Waterbury, Conn.
WILLIAM LYNN CHEMICAL CO., INC., Indianapolis, Ind.
F. B. STEVENS CO., Detroit, Mich.
MEAKER CO., Cicero, Ill.
GEORGE L. NANKERVIS CO., Detroit, Mich.
THE REYNOLDS CO., Philadelphia, Pa.
STANDARD PROCESS CORP., Chicago, Ill.
UDYLITE, Detroit, Mich.
S. A. DAY, Buffalo, N. Y.

The trend is to METALLIC RECTIFIERS

INDUSTRY DISCOVERS A THRIFTIER WAY TO GET LARGE BLOCKS OF DC POWER

Today, more than 16,000 kilowatts of General Electric Germanium rectifier power supplies are pouring out a vast amount of direct current to U.S. industries, and a greater amount are on order and in production. This mounting number of applications includes electro-chemical processing, steel mill cleaning and tinning lines, aluminum anodizing, aluminum pot lines and electro-plating. Three years ago, there were none!

Just as you'd suspect, the major reason behind this trend is increased economy . . . in first cost, installation cost, power cost, and maintenance.

Metallic rectifiers are mechanically static, comparatively light in weight, and require no special foundation. They are constructed in basic cubicles . . . building blocks of power. Thus, they can be easily installed anywhere, on balconies, in basements, or right at the utilization equipment.

First cost is frequently lower than other methods of conversion, and when installation savings, power savings, and maintenance savings are factored in, the total cost reduction is impressive.

Practically no maintenance is needed with metallic rectifiers because of their static nature. The only moving parts are either a small cooling fan or small water pump. Extensive life tests indicate no loss in efficiency, no aging, and consequently no apparent limit to the life of a rectifier cell.

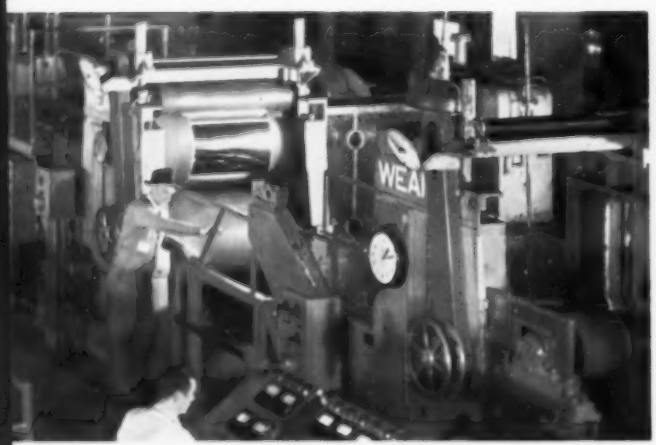
These combined advantages are the basis for the trend to metallic rectifiers. If you would like additional information, please contact your nearby G-E Apparatus Sales Office, or write to Section 464-1 General Electric Company, Schenectady 5, N. Y.

464-1

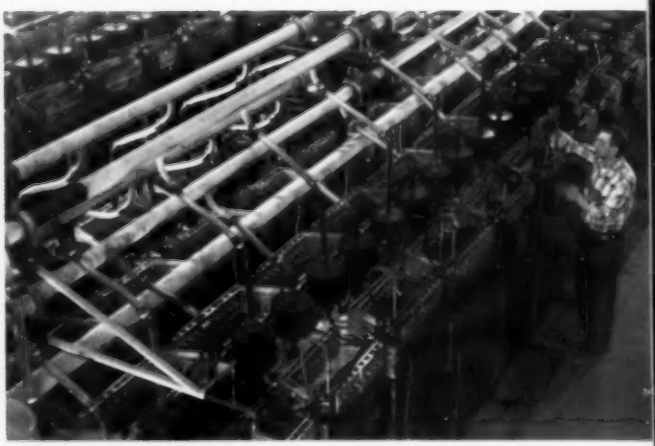
Progress Is Our Most Important Product

GENERAL ELECTRIC

RECTIFIER DEPARTMENT



DC POWER FOR STEEL MILLS—General Electric Germanium rectifiers are now being used for electrolytic cleaning and tinning lines, and for the economical production of hydrogen. Tinning lines like the one shown here are exhibiting power savings of up to 17%. Metallic rectifiers are sturdy and compact; and hence, easier to install. They need no oiling or periodic shutdown for cleaning and rebuilding.



DC POWER FOR ELECTRO-CHEMICAL PROCESSES—Here electrolytic cells produce hydrogen and oxygen by electrolysis. DC power—30,000 amperes at 65 volts—is supplied by G-E Germanium rectifiers. Metallic rectifiers are finding increased use in the electro-chemical industry due to their high efficiency, lower first cost, and continuity of service.

DC POWER FOR ALUMINUM ANODIZING—The G-E Germanium rectifier installation shown in the background supplies d-c power for anodizing the aluminum evaporators used in home refrigerators. The gold colored unit on the left has passed through the anodizing operation; the unit at the right has not yet been anodized. Seven cubicles provide 40,000 amperes at 24 volts d-c.

DC POWER FOR AUTOMOTIVE PLATING—This automobile grille has just been removed from the chromium plating tank shown at the right. Behind the inspector is a G-E Germanium rectifier installation of eight cubicles which delivers 48,000 amperes at 12 volts d-c. The plating industry has been quick to realize the increased economy and reliable service offered by Germanium rectifiers.

NEW DESIGN—Smaller size, greater dependability, and lower cost are the features of this new cubicle design. Dotted outline shows the former size. New design is 44% smaller, yet delivers 20% more power output.

SILICON RECTIFIER here supplies power for producing hydrogen. Because of its higher operating temperature and voltage, silicon will soon join the G-E rectifier line.

BENEFIT FROM

McGean Bright Nickel

Use a bright nickel solution
designed to provide
continuous operation with
infrequent need
for purification . . .

OBTAIN

brighter deposits
superior bright throwing power

WITH THESE FEATURES...

- simple control
- low cost
- infrequent bath treatment

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McGEAN

A. G. Pierdon
Co-Chairman

WELCOME TO THE MEMBERS AND GUESTS OF THE AMERICAN ELECTROPLATERS' SOCIETY

The Baltimore-Washington Branch proudly welcomes you to your 43rd Annual Convention.

In keeping with the increasing importance and complexity of the metal finishing industry, our Educational Committee, under the able leadership of Dr. Abner Brenner, is offering the largest number of papers ever presented at any American Electroplaters' Society Convention. The quality and timeliness of these papers match their quantity.

For the past two years, our Committee has been planning a program dedicated to you and your entire family.

A trip to Washington is both an education and a delightful experience. The Capital is a city of unsurpassed beauty, rich in historical significance and magnificently equipped to care for tourists, visitors and conventions. Every effort has been extended to give you and your family a truly memorable experience they will cherish for years. So, have fun!

ARTHUR G. PIERDON
General Chairman

J. Horelick, Finance

GREETINGS FROM JULES HORELICK

Your host branch is not one of the largest, but its contributions to "The Advancement of the Science of Electroplating" have been out of proportion to its size.

It was founded in May, 1928 through the activities of Wm. W. Chase, of the Agate Lacquer Company and a member of the New York Branch; Fred F. Pierdon, Art Metal Finishing Company, a founder of the Society; Dr. Wm. Blum, National Bureau of Standards; and T. F. Slattery, U. S. Bureau of Engraving & Printing, and a member of the Bridgeport Branch. They were assisted by National Officers Horace Smith, George Gehling and George Hogaboom. The permanent charter was granted in 1929. We were hosts to the well remembered National Convention in 1930 which operated on a budget of $5000.

Our branch has been noted for the quality of its membership. Speakers are always willing to visit us because of our reputation of an attentive audience that develops interesting discussions on all subjects related to the industry.

We have provided many speakers for other branch meetings and seldom have the technical sessions of our national convention been without a paper by some member of our branch. The branch has conducted several classes in electroplating under leadership of the National Bureau of Standards personnel. We have often provided members for committee assignments from the Executive Board.

Two of our members were elected President of the Society—T. F. Slattery in 1935 and K. M. Huston in 1947. Also two of our members, Dr. Wm. Blum and T. F. Slattery were elected to Honorary Membership.

Five of our charter members are still active in the affairs of the branch. We are proud of our contributions to the growth of the Society.

JULES HORELICK
President
Baltimore-Washington Branch

WELCOME LADIES

Washington, your capital city, awaits your coming. Much thought and planning has gone into our efforts to make it possible for you to have "A Capital Time with the AES in the Capital of the US" at this, the 43rd Annual Convention.

Twenty-six years ago, in 1930, our Branch was host to a wonderful convention group. Once again we cordially invite you to come to your city to see and to learn first hand of the many historical and significant happenings, past and present, which make Washington world famous. A warm welcome awaits you!

THE LADIES' COMMITTEE
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Chairman

Mary Pierdon,
Ladies

F. Ogburn,
Registration

T. R. Boggess,
Transportation

K. M. Huston,
Co-Chairman

Dr. A. V. Astin,
Keynote Speaker

Dr. Wm. Blum,
Honorary Chairman

Dr. A. Brenner,
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V. J. Hughes,
Plant Visits

A. A. Benderly,
Hotel

Dr. V. A. Lamb,
Hotel

W. H. Metzger, Jr.
Outing

C. H. Thiede,
Program

Mrs. E. Stricklen,
Children's Program

R. Stricklen, Jr.
Publicity

Bowerman

Rubinstein

Babcock

Stephens

Grimsinger

Beebe

Rothschild

Harwood

LeBrasse

Carroll

Sellers

Saltonstall

43rd Annual Convention of A. E. S.

FIRST EDUCATIONAL SESSION — MONDAY, JUNE 18

(SESSION A)

Chairman: **E. R. Bowerman, Jr.**, Sylvania Electric Products, Inc.

SOME RECENT DEVELOPMENTS IN SELECTIVE, LOCALIZED PLATING FOR ENGINEERING PURPOSES

by Marv Rubinstein, Metal Finishing Consultant

The operation formerly known as "brush" or "touch-up" plating has recently undergone a complete revolution. Primarily the paper covers techniques of operations including a description of a variety of engineering applications. The metallurgical properties of deposits obtained by such methods also receive some attention.

INVESTIGATION AND EVALUATION OF PLATING PROCESSES AND PLATING COMBINATIONS FOR USE ON ETCHED CIRCUITRY

by E. H. Babcock, R. K. Stephens, R. C. Grimsinger, Convair, Division of General Dynamics Corp.

This work covers the various processes, plating baths, and plate combinations proposed for use on etched circuitry fabricated from one and two side copper laminate glass epoxy board.

OVERLAY PLATING OF STEEL-BACK ALUMINUM LINED SLEEVE BEARINGS

by A. H. Beebe, Jr., B. F. Rothschild and G. J. LeBrasse, Federal-Mogul Division, Research and Development, Federal-Mogul-Bower Bearings, Inc.

One of the newer products in the sleeve bearing industry is the steel back – aluminum alloy lined bearing. This paper describes a method for electrodepositing a lead alloy overlay on such bearings.

THE PROTECTION OF MOLYBDENUM AGAINST HIGH TEMPERATURE OXIDATION

by Julius J. Harwood, Head Metallurgy Branch, Office of Naval Research, Navy Department

This paper reviews the status of the problem of the oxidation of molybdenum and attempts to summarize the research programs which have been underway for the development of protective coatings.

(SESSION B)

Chairman: **Dr. R. B. Saltonstall**, The Udylite Corporation

GAGING THIN NICKEL COATINGS BY X-RAY FLUORESCENCE

by K. G. Carroll and W. W. Sellers, International Nickel Company, Inc., Research Laboratory

Electrodeposited nickel coatings ranging in thickness from 10 to 200 microinches may be accurately measured by means of characteristic X-rays generated in the coating. Suitable X-ray apparatus is described, and optimum conditions for X-ray excitation, dispersion, and detection are discussed. The non-destructive character of the measurements is important in many plating applications.

COATING THICKNESS MEASUREMENT BY FILTERED X-RAY FLUORESCENCE

by Dr. Earl J. Serfass and Dr. Fred A. Achey, Department of Chemistry, Lehigh University

Using X-ray fluorescence methods, thickness of thin coatings can be determined by measuring either excitation of the substrate or the coating layer. The use of filters to measure characteristic X-ray fluorescence radiation is suggested as a method for quantitatively determining the thickness of thin coatings. The method involves excitation of both the coating and substrate with an incident X-ray beam, and subsequent measurement of only fluorescence from the coating. Easily prepared filters replace the usual collimator-crystal procedures.

Serfass

Acney

Foulke

Kardos

Safranek

Thomas

Teres

Schaer

Snell

Moeller

Max

Van Houten

CURRENT DISTRIBUTION ON MICROPROFILES
by Dr. D. Gardner Foulke and Dr. Otto Kardos,
Hanson-Van Winkle-Munning Company

The characteristic dimensions of microprofiles are relatively small with respect to: (1) The product of the specific conductivity and the slope of the polarization curve. (2) The "effective thickness" of the diffusion layer. Criterion 1 alone would lead to uniform current distribution on microprofiles under most conditions. Criterion 2, however, serves to explain both leveling and microthrow as it implies that the "effective thickness" of the diffusion layer is smaller for the peak than for the recess. New experimental data are presented.

LEVELING—DEFINITION, MEASUREMENT, AND UNDERSTANDING
by J. D. Thomas, General Motors Corp.

Leveling is defined. The bases for plating are electroforms of standard ruled specimens in which the spacing, depth, and angle of rulings were varied in a controlled manner. The degree of leveling on the plated samples was studied by means of the Surfagage, Tallysurf, interference microscope, and by cross-sectioning. Experimental data show that organic addition agent combinations primarily, influence the leveling characteristics of bright nickel plating baths.

SECOND EDUCATIONAL SESSION — TUESDAY, JUNE 19

(SESSION A)

Chairman: **J. Teres,** Wright Air Development Center

PROPERTIES OF ELECTRODEPOSITS AT ELEVATED TEMPERATURES
by W. H. Safranek and G. R. Schaer, Battelle Memorial Institute

Elevated temperature properties including oxidation resistance in air and molybdenum oxide, stress rupture, thermal expansion, thermal stability, ductility, and hot hardness were determined for nickel, chromium, and other electrodeposits. The results of the research showed promising leads for developing improved electrodeposits for protecting molybdenum and other metals against oxidation at high temperatures.

LIMITATIONS OF PLATED NICKEL IN JET ENGINE DESIGN
by R. W. Moeller and W. A. Snell, Pratt and Whitney Aircraft

This paper presents in graphic form some of the factors which restrict the use of plated nickel on highly stressed jet engine parts. Residual stress vs. temperature, residual stress vs. fatigue life, plate thickness vs. corrosion resistance and production control variations are discussed, showing the limitations of nickel plated from the Watts' type, sulfamate, and electroless nickel solutions.

SOME CHARACTERISTICS OF ELECTROFORMED IRON DEPOSITS
by Dr. A. M. Max, RCA Victor Record Division
and Dr. G. R. Van Houten, P. R. Mallory and Co.

Deposits from a typical iron chloride electroforming solution are investigated under a wide variety of deposition and solution variables. Cathode efficiency, deposit stress, tensile strength, and ductility as well as pitting are correlated with temperature, current density, acidity, ferric ion concentration and agitation. The importance of temperature is demonstrated and related to deposit stress.

A STUDY OF THE EFFECT OF SEVERAL ORGANIC ADDITION AGENTS ON THE HARDNESS AND RESIDUAL STRESS IN NICKEL DEPOSITS
by I. L. Newell, Henry Souther Engineering Co.

No hard and ductile metals are available as electrodeposited coatings with low residual tensile stress or compressive stress. The sulfamate formulation for Ni deposits was chosen to be modified with several organic addition agents to increase the hardness and produce a compressively stressed electrodeposit. Three organic addition agents were chosen for test: saccharin, paratoluene sulfonamide and naphthalene 1, 3, 6 trisulfonic acid. The results obtained show a correlation between the temperature, current density, stress and hardness with varying amounts of the addition agent.

Friedberg

Levy

Collard

Liu

Walton

Gilmont

Muraca

Forsyth

Newell

Shockley

Whitehurst

Scott

(SESSION B)

Chairman: **Dr. Earl J. Serfass,** Lehigh University

SPECTROCHEMICAL DETERMINATION OF NICKEL IN BRIGHT CADMIUM PLATING SOLUTIONS

by Henry R. Friedberg, Metal Finishing Consultant
Morton L. Levy, Laboratory Manager, Crobaugh Laboratories

In the control of brightener additions to cadmium plating solutions it is important to determine the amount of nickel present in the bath. The relatively small amounts of nickel make the use of spectrochemical techniques attractive for speed, convenience, and accuracy. This paper describes the method selected and includes experimental data and analytical curves. The preparation of standards is given.

COMPLETE POLAROGRAPHIC ANALYSIS OF CYANIDE ZINC PLATING BATHS

by T. H. Collard, Jr. and David K. H. Liu, Friedrich Refrigerators, Inc.

A brief review of polarographic methods used, to date, in cyanide zinc plating bath analyses is given. A method developed as a part of a general study undertaken in the authors' laboratory is described. This new polarograph makes possible the determination of zinc, total sodium cyanide, caustic soda, and sodium carbonate.

THE POLAROGRAPHIC DETERMINATION OF CADMIUM AND CYANIDE IN ALKALINE CADMIUM PLATING SOLUTIONS

by G. T. Forsyth, The Udylite Research Corp.

A rapid polarographic method for the determination of cadmium and total cyanide in cadmium plating solutions is presented. Both cadmium and total cyanide can be determined in 10 to 15 minutes. Data comparing results obtained using the method described and a conventional method of analysis is given together with the required calibration curves and a sample polarogram.

CONSTRUCTION AND OPERATING CHARACTERISTICS OF A NEW ELECTROPLATING CELL FOR CURRENT DENSITY STUDIES

by R. F. Walton, Radio Corporation of America
R. Gilmont, Manostat Corporation

A new type of electroplating cell, the "Hyperbolic Electroplating Cell" was developed. Cell calibration curves were experimentally developed which help to establish a simple mathematical formula expressing the linear relationship between primary current density and distance measured along the cathode of the cell.

RAPID ANALYSIS OF CYANIDE PLATING BATHS

by Dr. R. F. Muraca, Jet Propulsion Laboratories, California Institute of Technology

The development of a simple procedure for analyzing plating baths is described. The analysis can be carried out in the plating shop within 10 minutes. The apparatus necessary for the analysis can be constructed by any machine shop and can be calibrated in the plating shop. The required reagents are generally available in the plating shop or can be purchased locally.

THIRD EDUCATIONAL SESSION — TUESDAY, JUNE 19

Chairman: **F. L. Scott,** United Chromium-Corp. Div. Metal and Thermit Corp.

(SESSION A)

COATED ABRASIVE BELTS SPEED METAL WORKING PRODUCTION

(Motion picture in color)

by E. E. Oathout, Behr-Manning Coated Abrasives Div. of The Norton Company

A motion picture designed to show advantages offered by coated abrasive belts, their adaptability, and available machinery for mass production finishing.

FILTER MEDIA

by Q. O. Shockley, M. L. Whitehurst, Elmer Lundberg, John Hood, Indianapolis Branch, American Electroplaters' Society

The object of this paper is to collect and classify available information on filter media and present it as an aid in the selection of filter media for specific uses.

Lundberg

Hood

Sample

Le Fevre

Arndt

Hilkert

Ogburn

Rowe

Tobin

Smith

Pinner

Dow

TANK LININGS
by Kenneth G. Le Fevre, Metalweld, Inc.

The paper begins with a general discussion of the lining and coating materials that have been used in pickling and plating tanks. Various coating and lining materials are covered including the more recent "Combination Coatings". The economies of various types are discussed. Case studies are presented.

PLATING ROOM TANK VENTILATION EQUIPMENT
by F. W. Arndt, Chief Engineer, Heil Process Equipment Corp.

A brief discussion of the most important considerations for determining the exhaust volumes required for the various typical plating tanks is presented. With this as a basis, the paper is divided into five topics each being discussed mostly from a practical viewpoint: A) Hoods, B) Ducts, C) Fans, D) Fume Scrubbers, E) Stacks.

(SESSION B)

Chairman: **C. H. Sample,** International Nickel Co.

THE RADIOGRAPHIC DETECTION OF PORES IN PLATED COATINGS (AES Project 13)
by Fielding Ogburn and Margaret Hilkert, National Bureau of Standards

Techniques for making radiographs of metal coatings plated adherently on steel or on a radioactive basis metal are described. Either a radioactive metal or an X-ray machine may be used as the radiation source. Means of greatly improving sensitivity by use of microradiography are indicated.

EFFECT OF CORROSION ON THE GAS PERMEABILITY OF NICKEL ELECTRODEPOSITS
by Dr. J. Martin Tobin, General Electric Corp.
and Dr. D. Gardner Foulke, Hanson-Van Winkle-Munning Company

The method for measuring the permeability of electrolytic nickel foils to gases and the "intrinsic" permeability of various nickel deposits as well as wrought nickel are discussed. Data on the initial permeability of nickel-chromium foils is reported. Induced permeability after corrosion in 10 per cent sulfuric acid is also reported as are the results of a study of effect of electrolytic corrosion, according to the Pinner-Pierce method.

EFFECTS OF IMPURITIES AND PURIFICATION OF ELECTROPLATING SOLUTIONS 1. NICKEL SOLUTIONS
9. The Effects and Removal of Aluminum (AES Project 5)
by Dr. D. T. Ewing and Dr. A. J. Smith, Michigan State University
and Dr. W. O. Dow, Jr., Sunbeam Corporation

The effects of aluminum on the appearance, adhesion, ductility, salt spray corrosion resistance, hardness and throwing power on electrodeposited nickel were studied. Low and high pH Watts solutions were studied for effects on spray nickel deposits, organic and nickel-cobalt solutions for bright deposits.

EFFECTS OF IMPURITIES AND PURIFICATION OF ELECTROPLATING SOLUTONS 1. NICKEL SOLUTIONS
10. The Effects and Removal of Manganese (AES Project 5)
by Dr. A. J. Smith, Michigan State University
and Dr. R. J. Rowe, Dow Chemical Co.

The effects of manganese in solution in the physical properties of electrodeposited nickel were studied. As in previous work solutions employed were 2.2 and 5.2 pH Watts organic, and nickel-cobalt. Concentrations up to 300 mg/l showed no significant effect on any of the properties. Removal of manganese cannot be effected by either low current density electrolysis or high pH treatments.

PROGRESS REPORT ON ACCELERATED CORROSION TESTS FOR THE PERFORMANCE OF PLATED COATINGS
(AES Project 15)
by W. L. Pinner, Houdaille Industries, Inc.

The third report of the Project 15 Committee accounts for continuing work in an endeavor to produce a dependable reproducible corrosion test for plated coatings. The report considers in detail the intensified effort which has been expended on two tests.

Spenard

Wesley

McGraw

Faust

Cafferty

Harr

Wolf

McConnell

Narcus

Lux

Oathout

Gilbert

FOURTH EDUCATIONAL SESSION — WEDNESDAY, JUNE 20

(SESSION A)

Chairman: **Dr. W. A. Wesley,** International Nickel Co.

ELECTRODEPOSITION OF POROUS NICKEL-CADMIUM ALLOY

by L. D. McGraw, J. P. Spenard, and Dr. C. L. Faust,
Battelle Memorial Institute

Porous nickel-cadmium alloy plate was deposited from a sulfate-chloride bath. Porosity as high as 30 to 50 per cent was induced by a colloidal addition agent. Gelatin was added to control stress and nodulation up to thickness of about 0.015 inch. Plate composition could be controlled up to 5 per cent cadmium.

COLD-SILVER ALLOY PLATING

by R. E. Harr and A. G. Cafferty, Western Electric Co., Inc.

This report covers investigations of gold silver alloy plating from a cyanide type solution. The investigation was conducted to develop a set of conditions which would produce an 8 per cent silver gold alloy and several sets of conditions which yield such an alloy are given.

NICKEL-IRON ALLOY DEPOSITS FOR MAGNETIC SHIELDING

by V. P. McConnell and Dr. I. W. Wolf, General Electric Co.

This paper covers the development of nickel-iron deposits to obtain thicknesses of plate from .003 inch to .025 inch. The effects of metal ion concentration and the conditions necessary to arrive at a deposit of the greatest initial permeability are listed. The effects of organic addition agents to reduce brittleness are also covered.

IMPROVED TECHNIQUES FOR ELECTROLESS NICKEL PLATING ON NON-CONDUCTORS

by Dr. Harold Narcus, President and Technical Director,
Electrochemical Industries, Inc.

This paper describes new and improved techniques for depositing electroless nickel coatings on non-conductors specifically ceramics, glass and plastics. More rapid and complete coverage of the non-conductive surface and greater adhesion of the nickel deposit to that surface result from employment of "de-polarizing", "sensitizing" and "activating" techniques which have been evaluated fully in many diversified industries.

(SESSION B) Chairman: G. A. Lux, Oakite Products, Inc.

STUDY OF PHOSPHATE TREATMENTS FOR METALS

by Lloyd Gilbert, Rock Island Arsenal

This paper covers the actual formulation of the phosphate coating chemicals and the functions of the individual components of the bath. The erratic corrosion behavior of the phosphate coatings is explained. A theory concerning the proper approach to improving the quality of phosphate coatings is presented as a conclusion drawn from the data presented.

Leithauser

ENAMELING OF CHROMIUM PLATE

by Gene L. Leithauser, Research Staff, General Motors Corporation

This report covers factors affecting the adhesion of organic finishes to plated parts. This will include plating procedures as well as post-plating procedures that influence the durability of the organic finish. Pre-paint methods, chemical treatments on chromium plate, and use of primers is covered. Durability of pigmented and clear finishes over plated parts are also discussed. Evaluation methods and results of surveys of durability are included.

Du Rose

SOME NOTES ON THE ELECTRODEPOSITION OF ANTIMONY

by A. H. Du Rose, Harshaw Chemical Co.

The results reported are a summary of an experimental survey made to determine the properties of electrodeposited antimony as a decorative and protective coating. The outstanding property of antimony is its lack of ductility or cohesive strength. In spite of this, good but not consistently reproducible corrosion protection was obtained. There appears to be some relation between adhesion and the respective orientations of the substrate and deposit.

Moore

A TOOL FOR DECISION—ACCEPTANCE SAMPLING BY VARIABLES AND HOW IT WORKS

by Roger H. Moore, Los Alamos Scientific Laboratory

This paper describes acceptance sampling by variables which is a set of rules for deciding whether or not a lot of production pieces is acceptable under specification limits. The effectiveness of the set of rules is measured by the shape of an operating characteristic curve which gives the probability of accepting a lot if it has a certain proportion of defective parts in it.

FIFTH EDUCATIONAL SESSION — THURSDAY, JUNE 21

(SESSION A)

Chairman: **Arthur Logozzo**, Nutmeg Chrome Corp.

Logozzo

CHROMIUM PLATING OF GUN BORES

by Dr. V. A. Lamb and J. P. Young, National Bureau of Standards

This paper describes the history of gun barrel plating prior to World War II, and since that period. The physical and chemical properties required of a gun bore coating are outlined, and the degree to which chromium and other metals meet these requirements is indicated. Methods for applying chromium electrodeposits to gun bores are described. Electropolishing of gun bores is also described.

Lamb

Missel

CHROMIUM PLATING OF TITANIUM ALLOYS

by L. Missel, Lockheed Aircraft Corporation

Highly adherent chromium has been applied to several titanium alloys by electroplating. The process consists of an immersion treatment in a simple aqueous bath followed by plating in a conventional sulfate bath. A simple semi-quantitative plate adhesion-bearing property evaluation test has been developed.

Stanley

THE ADHESION OF ELECTROPLATED COATINGS TO TITANIUM

by C. Stanley and Dr. Abner Brenner, National Bureau of Standards

Good adhesion of electrodeposited coatings to titanium is prevented by an oxide film. A pretreatment for circumventing this difficulty was developed which involved the formation of a titanium fluoride coating by an electrolytic treatment in a solution of hydrofluoric and acetic acids.

Levy

ELECTROPLATING CHROMIUM ON UNUSUAL ALLOYS

by Charles Levy, Watertown Arsenal

By variations in pretreatments, chromium has been electrodeposited from a conventional bath on some unusual alloys. Included among the basis metals were high-cobalt alloys, such as Stellite 21, S-816 and V-36; high nickel alloys, such as Hastalloy B, Hastalloy C and Inconel X; molybdenum; and stainless steels, such as 502 and 19-9DL. Chromium plated AISI 4340 steel was used for comparison purposes. A nickel chloride-hydrochloric acid electrolytic treatment applied prior to chromium plating was the principal means by which sound deposits with good adhesion were achieved.

(SESSION B)

Chairman: **Dr. William Blum**

Doumas

A NEW ORGANO-ALUMINUM CHLORIDE BATH FOR DEPOSITION OF ALUMINUM

by Dr. Nelson F. Murphy, Virginia Polytechnic Institute
and Dr. Arthur C. Doumas, Dow Chemical Co.

A new electrolyte for the deposition of aluminum, consisting of a solution of aluminum chloride in ether and substituted amine, is described. The limitations of operating conditions are given. The deposits are adherent, can be made of considerable thickness and may be polished. Bright deposits have been obtained from the bath at high current densities.

Arnold

THE GROWTH AND PROPERTIES OF METAL WHISKERS

by S. M. Arnold, Bell Telephone Laboratories, Inc.

An account of studies at Bell Telephone Laboratories following the discovery that failure of certain electrical equipment was a result of the presence on a metal surface of a number of microscopic filaments. The filaments or "whiskers" were found to be metal single crystals possessing unique properties. These unusual properties are attributed to a perfection of structure not found in bulk material, and hence are of interest in fundamental studies of the metallic state.

Murphy

STUDY OF ADHESION BY THE HIGH SPEED ROTOR TECHNIQUE

by Dr. J. W. Beams, Department of Physics, University of Virginia

If films of a material are uniformly deposited on the peripheries of cylindrical rotors having different radii and the rotor speeds are increased until the material is thrown off, both the tensile strength and the adhesion to the rotor surface of the material may be determined. If the material is deposited on a rotor in circumferentially disconnected patches, the absolute value of the adhesion can be obtained directly. The techniques of spinning magnetically suspended rotors in a vacuum is described and its application to the measurement of the adhesion of electrodeposited and evaporated metals on rotor surfaces is discussed.

Tucker

Beuckman

DISSOLVED GASES IN PLATING BATHS

by W. M. Tucker and F. O. Beuckman, Eastman Kodak Co.

It was found that a Watts nickel bath in good operating condition, when properly degassed, would yield pit-free deposits until it became saturated with a gas or gases at the temperature of operation. A suitable device ready made was found in the VanSlyke Blood-Gas apparatus. Using the VanSlyke Blood-Gas apparatus equilibrium studies indicate the limits of this approach and confirm the conditions which will produce pit-free deposits.

PROGRAM OF CONVENTION EVENTS

(Eastern Daylight Savings Time used throughout Program)

Convention Registration in upper lobby on mezzanine floor.

Sunday, June 17 ..... 1:00 p.m. to 9:00 p.m.
Monday, June 18 ..... 9:00 a.m. to 5:00 p.m.
Monday, June 18 ..... 8:30 p.m. to 10:30 p.m.
Tuesday, June 19 ..... 9:00 a.m. to Noon
Wednesday, June 20 ..... 9:00 a.m. to 1:30 p.m.
Thursday, June 21 ..... 9:00 a.m. to Noon

The registration fee of $20.00 for men and women and $10.00 for children 16 and under provides each registrant with a book of tickets covering all events on each program.

Table reservations for the Banquet on Thursday, June 21, should be made in advance at the Banquet Reservation Desk in the upper lobby, starting Tuesday, June 19, at 9:00 a.m. Banquet tickets for children are not included in their registration ticket books. These may be purchased for $7.00 additional, with their registration.

Events at the Hotel Statler unless otherwise indicated.

Sunday, June 17, 1956

10:00 a.m. AES Executive Board Meeting (Massachusetts Room)

8:00 p.m. AES Get Together Party (Federal and South American Rooms) Light refreshments
Admission by ticket

Monday, June 18, 1956

10:00 a.m. Opening Session and Business Meeting AES Supreme Society (Presidential Room)
Invocation: The Rev. F. C. Mesle, Rochester Branch
General Chairmen:
Arthur G. Pierdon
Kenneth Huston
Keynote Speaker:
Dr. Allen V. Astin, Director, National Bureau of Standards

11:00 a.m. *First Business Session*: AES Supreme Society (Federal Room)
Supreme Society Delegates and Alternates
Clyde Kelly, President, Executive Board, Presiding Officer
(Note: Meeting will convene immediately after Dr. Astin's address)
Children's Program. First Tour (Sightseeing visit of National Zoological Park and Smithsonian Institute.)

12:00 Noon Metal Finishing Suppliers' Association, Luncheon and Meeting (South American Room)

12:00 Noon Ladies' Luncheon (Willard Hotel) Admission by ticket

12:00 Noon Branch Secretaries' Luncheon (California Room)

12:15 p.m. Speakers' Luncheon (Ohio Room)

2:00 p.m. Ladies' Tour of Washington (F Street entrance, Willard Hotel)
Admission by ticket

NOTE: The Convention Committee has requested all suppliers to close their hospitality rooms during the educational sessions and at one a. m.

2:00 p.m.

FIRST EDUCATIONAL SESSION

Session A (Presidential Room)

"Novel Applications of Plating"

Chairman: E. R. Bowerman, Jr., Sylvania Electric Products, Inc.

1. Some Recent Developments in Selective Localized Plating for Engineering Purposes	Marv Rubinstein, Metal Finishing Consultant
2. Investigation and Evaluation of Plating Processes and Plating Combinations for Use on Etched Circuitry	E. H. Babcock, R. K. Stephens, and R. C. Grimsinger, Convair, Div. of General Dynamics Corp.
3. Overlay Plating of Steel-Back Aluminum-Lined Sleeve Bearings	A. H. Beebe, Jr., B. F. Rothschild and G. J. LeBrasse, Federal-Mogul-Bower Bearings, Inc.
4. The Protection of Molybdenum Against High Temperature Oxidation	Julius J. Harwood, Office of Naval Research, Dept. of the Navy

Session B (Congressional Room)

"Thickness and Distribution of Coatings"

Chairman: Dr. R. B. Saltonstall, The Udylite Corporation

5. Gaging Thin Nickel Coatings by X-Ray Fluorescence	W. W. Sellers and Kenneth Carroll, Research Laboratory, International Nickel Co., Inc.
6. Coating Thickness Measurement by Filtered X-Ray Fluorescence	Dr. E. J. Serfass and Dr. F. A. Achey, Lehigh University
7. Current Distribution on Microprofiles	Dr. D. G. Foulke, and Dr. Otto Kardos, Hanson-Van Winkle-Munning Co.
8. Leveling—Definition, Measurement and Understanding	J. D. Thomas, General Motors Corp.

Admission by badge

2:30 p.m. Editorial Board Meeting (Massachusetts Room)

6:30 p.m. Past Presidents' Dinner (California Room)

9:00 p.m. Open House (Presidential and Congressional Rooms)

All registrants will be guests of the Metal Finishing Suppliers' Association. Refreshments and dancing. Buffet served at 10:30 p.m.

Admission by ticket

Tuesday, June 19, 1956

8:00 a.m. Research Committee Breakfast (Massachusetts Room)

Speakers' Breakfast (Ohio Room)

9:00 a.m.

SECOND EDUCATIONAL SESSION

Session A (Presidential Room)

"Physical and Mechanical Properties of Deposits"

Chairman: J. Teres, Wright Air Development Center

9. Properties of Electrodeposits at Elevated Temperatures	W. H. Safranek and G. R. Schaer, Battelle Memorial Institute
10. Limitations of Plated Nickel in Jet Engine Design	R. W. Moeller and W. A. Snell, Pratt and Whitney Aircraft
11. Some Characteristics of Electroformed Iron Deposits	Dr. A. M. Max, Radio Corp. of America, Dr. G. R. Van Houten, P. R. Mallory and Co.

	12. A Study of the Effect of Several Organic Addition Agents on the Hardness and Residual Stress in Nickel Deposits	I. L. Newell, The Henry Souther Engineering Co.

Session B (Congressional Room)

"Analysis and Control"

Chairman: Dr. Earl J. Serfass, Lehigh University

	13. Spectrochemical Determination of Nickel in Bright Cadmium Plating Solutions	Henry Friedberg, Metal Finishing Consultant, Morton Levy, The Frank L. Crobaugh Laboratories
	14. Complete Polarographic Analysis of Cyanide Zinc Plating Baths	Thomas H. Collard, Jr. and David K. H. Liu, Friedrich Refrigerators, Inc.
	15. The Polarographic Determination of Cadmium and Cyanide in Alkaline Cadmium Plating Solutions	G. T. Forsyth, Udylite Research Corp.
	16. Construction and Operating Characteristics of a New Electroplating Cell for Current Density Studies	R. F. Walton, Radio Corp. of America and R. Gilmont, Manostat Corp.
	17. Rapid Analysis of Cyanide Plating Baths	Dr. R. F. Muraca, Jet Propulsion Labs., California Institute of Technology

Admission by badge

12 Noon Branch Librarians' Luncheon (California Room)

12 Noon "Aunt Ella" Luncheon for Ladies sponsored by Oakite Products, Inc. David X. Clarin, Host (Terrace Room National Airport) Admission by ticket

1:00 p.m. Annual Golf Tournament, Metal Finishing Suppliers' Association, Manor Country Club, Norbeck, Md.

2:00 p.m. East-West Baseball game
Baseball Diamond No. 25, 25th St. and Constitution Ave.

2:00 p.m. Research Committee Meeting (Massachusetts Room)

6:30 p.m. Speakers' Dinner (New York Room)

8:00 p.m.

THIRD EDUCATIONAL SESSION

Session A (Presidential Room)

"Equipment and Engineering"

Chairman: F. L. Scott, United Chromium Corp.
Div. Metal and Thermit Corp.

	18. Coated Abrasive Belts Speed Metal Working Production (Motion picture in color)	E. E. Oathout, Behr-Manning Coated Abrasives Div. of The Norton Company
	19. Filter Media	M. L. Whitehurst, Elmer G. Lundberg, Quentin O. Shockley, and John M. Hood, Indianapolis Branch of American Electroplaters' Society
	20. Tank Linings	Kenneth G. LeFevre, Metalweld, Inc.
	21. Plating Room Tank Ventilation Equipment	F. W. Arndt, Heil Process Equipment Corp.

Session B (Congressional Room)

"Protective Value and Related Properties of Coatings"

Chairman: C. H. Sample, International Nickel Co.

	22. Radiographic Detection of Pores in Plated Coatings (AES Project 13)	Fielding Ogburn and Margaret Hilkert, National Bureau of Standards

23.	Effect of Corrosion on the Gas Permeability of Nickel Electrodeposits	Dr. J. Martin Tobin, General Electric Corp. and Dr. D. G. Foulke, Hanson-Van Winkle-Munning Co.
24.	The Effects of Impurities and Purification of Electroplating Solutions. I. Nickel Solutions (9) The Effects and Removal of Aluminum	Dr. D. T. Ewing, Dr. A. J. Smith, Michigan State University, and Dr. W. O. Dow, Jr., Sunbeam Corp.
25.	(10) The Effects and Removal of Manganese (AES Project 5)	Dr. A. J. Smith, Michigan State University and Dr. R. J. Rowe, Dow Chemical Co.
26.	Progress Report on Accelerated Corrosion Tests for the Performance of Plated Coatings (AES Project 15)	Dr. W. L. Pinner, Houdaille Industries, Inc.

Admission by badge

WEDNESDAY, JUNE 20, 1956

8:00 a.m. Speakers' Breakfast (Ohio Room)

9:00 a.m.

FOURTH EDUCATIONAL SESSION

Session A (Presidential Room)

"Alloy Plating"

Chairman: Dr. W. A. Wesley, International Nickel Co.

27.	Electrodeposition of Porous Nickel-Cadmium Alloy	L. D. McGraw, J. P. Spenard and Dr. C. L. Faust, Battelle Memorial Institute
28.	Gold-Silver Alloy Plating	A. G. Cafferty and R. E. Harr, Western Electric Co.
29.	Nickel-Iron Alloy Deposits for Magnetic Shielding	V. P. McConnell, Dr. I. W. Wolf, Electronics Div., General Electric Corp.
30.	Improved Techniques for Electroless Nickel Plating on Non-Conductors	Dr. Harold Narcus, Electrochemical Industries, Inc.

Session B (Congressional Room)

"Three Different Coating Types—A Trilogy"

Chairman: G. A. Lux, Oakite Products, Inc.

31.	Study of Phosphate Treatments for Metals	Lloyd Gilbert, Rock Island Arsenal
32.	Enameling of Chromium Plate	Gene L. Leithauser, Research Staff, General Motors Corp.
33.	Some Notes on the Electrodeposition of Antimony	A. H. Du Rose, The Harshaw Chemical Company
34.	A Tool for Decision—Acceptance Sampling by Variables and How It Works	Roger H. Moore, Los Alamos Scientific Laboratory

Admission by badge

10:00 a.m. AES Public Relations Task Committee (Massachusetts Room)

12:00 Noon Michigan State Alumni Luncheon (California Room)

9:30 p.m. American Electroplaters' Society Floor Show and Dance (Presidential and Congressional Rooms)

Admission by ticket

THURSDAY, JUNE 21, 1956

8:00 a.m. Speakers' Breakfast (Ohio Room)

FIFTH EDUCATIONAL SESSION

9:00 a.m. **Session A (Presidential Room)**

"Chromium Plating"

Chairman: A. Logozzo, Nutmeg Chrome Corp.

35.	Chromium Plating of Gun Bores	Dr. V. A. Lamb and J. P. Young, National Bureau of Standards
36.	Chromium Plating of Titanium Alloys	L. Missel, Lockheed Aircraft Corp.
37.	The Adhesion of Electroplated Coatings to Titanium	Connie Stanley and Dr. Abner Brenner, National Bureau of Standards.
38.	Electroplating Chromium on Unusual Alloys	Charles Levy, Watertown Arsenal

Session B (Congressional Room)

"Basic Studies of Baths and Deposits"

Chairman: Dr. William Blum

39.	A New Organo-Aluminum Chloride Bath for Deposition of Aluminum	Dr. Nelson F. Murphy, Virginia Polytechnic Institute, Blacksburg, Va. and Dr. Arthur C. Doumas,
40.	The Growth and Properties of Metal Whiskers	Dow Chemical Co. S. M. Arnold, Bell Telephone Labs., Inc.
41.	Study of Adhesion by the High Speed Rotor Techniques	Dr. J. W. Beams, Dept. of Physics, Rouss Physical Laboratory, Univ. of Virginia
42.	Dissolved Gases in Plating Baths	W. M. Tucker and F. O. Beuckman, Eastman Kodak Co.

Admission by badge

12 Noon Ladies' Luncheon, sponsored by Udylite Corp. with talk by Dr. Richard B. Saltonstall. (Mayflower Hotel)

2:00 p.m. Ladies Plato Party with Mrs. J. Wiarda in charge of prize distribution (Mayflower Hotel)

2:00 p.m. Final Business Session, AES Supreme Society (Federal Room)

7:00 p.m. Annual Banquet and Dance (Presidential and Congressional Rooms) Admission by reservation ticket only. Your registration book ticket must be exchanged for a special Banquet ticket. Ticket exchange starts at 9:00 a.m. Tuesday, June 19, at Banquet Reservation Desk in upper lobby.

LADIES' PROGRAM

SUNDAY, JUNE 17, 1956

8:00 p.m. Get Together Party

This is the time and place to greet your your old friends and to make new ones. Come one, come all!

Refreshments

Hotel Statler, Federal & South American Rooms

Admission by ticket.

MONDAY, JUNE 18, 1956

10:00 a.m. Opening Session

Ladies, see your men off to a good start for a successful Convention! Hear Dr. Allen V. Astin of the National Bureau of Standards deliver the keynote address.

Hotel Statler, Presidential Ballroom.

12 Noon Luncheon

Meet with the Ladies Committee for luncheon in the newly decorated Grand Ballroom of Washington's most historic hotel — The Willard — here presidents have resided; the great have registered; historical decisions have been made; and all are graciously received.

Willard Hotel, Grand Ballroom

Admission by ticket.

2:00 p.m. Washington Tour

Get a bird's eye view of your Nation's Capital.

F Street Entrance—Willard Hotel

Bus Ticket in Ladies Book

9:00 p.m. Metal Finishing Suppliers' Association Open House

Fellowship, refreshments, and dancing will make a long to be remembered evening.

Buffet Supper at 10:30
Door Prizes
Hotel Statler, Presidential and Congressional Rooms
Admission by ticket.

TUESDAY, JUNE 19, 1956

12 Noon **Luncheon**
The Aunt Ella Society Luncheon, sponsored by Oakite Products, Inc. awaits you at the Terrace Dining Room, National Airport. Dave Clarin, our genial host, makes it a delightful party in a most unusual setting.
Admission by ticket.

WEDNESDAY, JUNE 20, 1956

1:00 p.m. **Trip to Mt. Vernon**
Buses: 16th St. Entrance—Hotel Statler
This is your opportunity to see the Changing of the Guard at the Tomb of the Unknown Soldier, to ride through Old Alexandria, to visit Mt. Vernon, and to enjoy a beautiful boat ride on historic Potomac River. Use tickets as marked.

9:30 p.m. **Floor Show and Dance**
Hotel Statler, Presidential and Congressional Rooms
A gala evening of fun and dancing is in store for you. Don't miss.
Admission by ticket.

THURSDAY, JUNE 21, 1956

12 Noon **Luncheon**
The Udylite Corporation entertains you in the Grand Ballroom of the elegant Mayflower Hotel. Our host, Dr. Richard Saltonstall, will conduct the ladies' "Educational Session." He will discuss "What the Quality of Plating Means to You."
Admission by ticket.

2:00 p.m. **Plato Party**
Is this your lucky day? Mrs. Joan Wiarda, our Guest Hostess "with the mostess," provides an afternoon of fun.
Mayflower Hotel—Grand Ballroom
There will be fabulous prizes galore.
Admission by ticket.

Before leaving you will receive:
1. Orchids from the Rapid Electric Company
2. Ladies gift from the Baltimore-Washington Branch.

Use tickets in book

7:00 p.m. **Annual Banquet—Dancing**
Hotel Statler—Presidential and Congressional Rooms
A grand climax for your Washington visit! Be sure to change your Banquet ticket for a table reservation.
Prizes and awards will be made this evening.

The Washington Tour at 2:00 p.m. on Monday will give the Ladies an all over look at the beauties of Washington. Optional tours have been arranged which will allow more time for seeing individual features of the city.

1. "Tuesday, June 19, 8:30 a. m. An optional sightseeing trip. Tour B, Interior of Public Buildings. Price $2.00. Tickets may be purchased at Registration Desk."
2. "Wednesday, June 20, 8:30 a. m. An optional sightseeing trip. Tour E, Shrines and Cathedrals. Price $2.00. Tickets may be purchased at Registration Desk."

Tickets for these trips will be available on the preceding day to enable us to order the buses.

CHILDREN'S PROGRAM

SUNDAY, JUNE 17, 1956

8:00 p.m. **Get Together Party**
Hotel Statler, Federal & South American Rooms—Admission by ticket.

MONDAY, JUNE 18, 1956

11:00 a.m. to 4:00 p.m. **Sightseeing**
Bus: Hotel Statler—16th St. Entrance
Smithsonian Institute & Museum of Natural History—Use ticket in book. National Zoological Park.

Lunch

9:00 p.m. **Metal Finishing Suppliers' Association Open House**
Admission by ticket.

TUESDAY, JUNE 19, 1956

10:00 a.m. to 4:00 p.m. **Sightseeing**
Bus: Hotel Statler—16th St. Entrance
Washington Monument
U. S. Capitol (Guided Tour)
Lunch
Federal Bureau of Investigation

Trip through Potomac Park
Use ticket in book.

WEDNESDAY, JUNE 20, 1956

1:00 p.m. Trip to Mt. Vernon
Bus: Hotel Statler—16th St. Entrance
See Changing of the Guard at the Tomb of the Unknown Soldier
Ride Through Old Alexandria
Visit Mt. Vernon
Enjoy a boat ride on historic Potomac River—Use ticket as marked.

9:30 p.m. Floor Show
Admission by ticket.

THURSDAY, JUNE 21, 1956

10:00 a.m. to 4:00 p.m. Sightseeing
Bus: Hotel Statler—16th St. Entrance
White House
Bureau of Printing & Engraving
Lincoln Memorial
Lunch
Washington National Airport
Use ticket in book.

SPECIAL EVENTS

TUESDAY, JUNE 19
East-West Baseball Game
Game starts at 2:00 P. M.

Baseball Diamond No. 25. 25th Street and Constitution Avenue, N.W. Allow 15 minutes for transportation from hotel.

The diamond has been engaged and athletic equipment has been reserved. However, the *game will be played only if sufficient members show interest in playing* by Monday evening, June 18.

Players should *register at the Information Booth.* A notice will be posted at the Information Booth if insufficient players register.

SPECIAL EVENTS
Sightseeing Tours

The Gray Line offers two special sightseeing tours of Washington to the conventioneers for half the regular cost of the trips. Neither trip will cover the same points covered by other trips scheduled as part of the convention.

Tickets may be purchased at the Information Desk.

THE TOURS WILL BE CONDUCTED ONLY IF 25 OR MORE PEOPLE PURCHASE TICKETS.

TUESDAY, JUNE 19
Gray Line Tour B

Bus leaves 16th Street hotel entrance at 8:30 a.m. Returns about 11:30.

A personally conducted tour of the downtown area and government buildings. Includes complete tours of the Bureau of Engraving and Printing, The American Union Building; The White House, the United States Capitol, and the Smithsonian Institute.

TICKETS: Special at $2.00 each (Regular Price $4.00). Twenty-five tickets must be sold at the information desk before 5:00 p.m. on Monday, June 18, or the tour will not be conducted.

WEDNESDAY, JUNE 20
Gray Line Tour E

Bus leaves 16th Street hotel entrance at 8:30 a.m. Returns about 11:30.

A tour of the residential section and churches. Passes many embassies, legations and prominent homes. Includes stops at the Islamic Center, Episcopal Cathedral of Saints Peter and Paul, National Shrine of the Immaculate Conception and the Franciscan Monastery.

TICKETS: Special at $2.00 (Regular price $4.00). Twenty-five tickets must be sold at the Information Desk before 5:00 p.m. on Tuesday, June 19 or the tour will not be conducted.

TUESDAY, JUNE 19
Golf Tournament
Manor Country Club, Norbeck, Maryland

The MFSA has arranged to hold its annual golf tournament at the Manor Country Club near Norbeck, Maryland.

The club is on Georgia Avenue extended (Maryland Route 97) near Norbeck, and is about 15½ miles from the Statler Hotel. Driving time is about 1 hour. Further details will be available at the Information Desk. Starting Time: 1:00 P. M.

PLANT VISITS

The Plant Visitation Committee has arranged four tours in interesting facilities in Washington and Baltimore. The number of visitors to each plant is limited by facilities to handle the group.

Tickets for each trip may be obtained from the Information Booth on a "first come-first served" basis.

All bus transportation is furnished by the Convention Committee.

If you register for one of these trips and learn you cannot take advantage of it, please return your ticket. Otherwise you may prevent a fellow member taking advantage of it.

TUESDAY, JUNE 19

Visit #1
National Bureau of Standards
Connecticut and Van Ness Sts., N.W.
Visit limited to 165 persons

Bus leaves 16th Street hotel entrance at 1:25 p.m. Returns to hotel about 4:45 p.m.

The National Bureau of Standards provides basic standards for science and industry and serves the Federal Government as a scientific laboratory in the physical sciences. The tour will be picked from the following facilities operating at the time of the convention: The multi-million volt X-ray involved in recent atomic energy developments; the electrodeposition laboratories where developments in electroless nickel, molybdenum, aluminum, titanium, and gun barrel plating and HAE coatings will be shown; the standards section which includes standard of weights, lengths and the new green wave length standard; the high temperature laboratory where rocket, jet engines and gas turbines are studied.

Visit #2
The Western Electric Company
2500 Broening Highway
Baltimore, Maryland
Visit limited to 80 persons

Bus leaves 16th Street hotel entrance at 12:15 p.m. Returns to hotel about 5:15 p.m.

Arrangements have been made for the visitors to purchase a box lunch enroute.

This visit will include the continuous wire plating operation where twenty-five steel wires are plated with sufficient copper to carry the telephone conversation. This is followed by electrodeposits of lead and brass in a tandem operation. Two machines are in operation. Each has a wire travel of about 600 feet. You will also see the high speed insulation of wire with rubber-type and plastic compounds.

THURSDAY, JUNE 21

Visit #3
U. S. Bureau of Engraving and Printing
14th and C. Streets, S.W.
Visit limited to 165 persons

Bus leaves 16th Street hotel entrance at 12:40 p.m. Returns to hotel about 4:00 p.m.

This is not the standard tour conducted by the Bureau for tourists to Washington.

You will see the electrolytic process of producing plates for printing paper currency by electrodepositing coatings of nickel, iron and chromium over carefully prepared master plates. Then you will see the printing of paper currency from these plates. $275,000,000,000 of currency was printed in 1954. You will also see the printing of postage and revenue stamps and U. S. Bonds, including the well advertised Savings Bonds.

VISIT #4
Potomac Electrotype Company and Judd & Detweiler
1508 Eckington Place, N.E.
Visit limited to 40 persons

Bus leaves 16th Street hotel entrance at 1:25 p.m. Returns to hotel about 4:45 p.m.

The National Geographic Magazine is produced in these adjoining plants. You will see the production of electrotypes which includes casting of the type slugs and pressing them into plastic molds. These are plated with copper and chromium and backed with a special alloy. The color plates must match on the paper within eight one thousandths of an inch. You will also see printing of next month's Geographic by the wet printing process where as many as four colors may be printed wet, one upon the the other. Then you will see how these printed sheets, each of which will make 64 pages of the Geographic, are folded and bound into the magazine.

MFSA

METAL FINISHERS SUPPLIERS ASSOCIATION PROGRAM

MONDAY, JUNE 18

12 Noon Luncheon and Meeting (South American Room)
9:00 P.M. Open House (Presidential and Congressional Rooms)

TUESDAY, JUNE 19

1:00 P.M. Golf Tournament (Manor Country Club, Norbeck, Md.)

J. J. Duffy, Jr.
1st Vice-President

T. A. Trumbour
Treasurer

A. P. Munning
Executive Secretary

Herman J. Struckhoff
President

M. M. Beckwith
2nd Vice-President

E. W. Couch
3rd Vice-President

Manson Glover
Past President

NAMF

NATIONAL ASSOCIATION OF METAL FINISHERS PROGRAM

Pallk

SUNDAY, JUNE 17

9:00 A.M. Annual Meeting of Membership and Election of Officers (Mayflower Hotel)
11:00 A.M. Board of Directors Meeting (Mayflower Hotel)

MONDAY, JUNE 18

2:15 P.M. Management Seminar (Mayflower Hotel)

"Waste Disposal Treatment—Case History"
William Acks, Assistant Gen'l Mgr.
Bechtel-McLaughlin Corp.
Sandusky, Ohio

"Labor Relations Problems"
Robert L. Giesel, President
Adolph Plating, Inc.
Chicago, Ill.

"General Shop Operating Problems"
S. C. Taormina, Director
Platers Technical Service
N. Y. and Chi. and Tech. Dir. to the Assoc.

"Work Simplification for the Job-Shop"
S. J. Fecht, President
S. J. Fecht & Associates
Chicago and New York

6:30 P.M. Cocktail Party (Mayflower Hotel)
7:00 P.M. Banquet (Mayflower Hotel)

AES

New Appointments to AES Research Committee and PLATING Editorial Board

Six new members to the Society's Research Committee and to PLATING's Editorial Board were confirmed by the Executive Board at its recent meeting. They are as follows:

Research Committee—Leslie Diveley, Cutler-Hammer, Inc., a member of the Editorial Board, 1955–1956; Style and Format Committee; Educational Chairman, 1949 Convention; Special Committee on Broadening the Scope of the Society. Russell E. Harr, Western Electric, a member of the Editorial Board, 1955–1956; By-Laws Committee; AES Delegate to the Intersociety Corrosion Committee. Leland M. Morse, Chrysler Corporation, member of the Editorial Board 1951–1954; Research Committee Project No. 5.

Editorial Board—Dr. Abner Brenner, National Bureau of Standards, Educational Chairman, 1956 Convention. S. Lewis Doughty, The Lea Manufacturing Company, co-authored paper on "Water Base Liquid Buffing Compounds" with E. T. Candee; speaker at Chicago, Bridgeport, Rockford and St. Joseph Valley Branches on "Bright Plating Processes." William Tucker, Eastman Kodak Co., Vice-Chairman, Projects Nos. 4 and 7 (1947); Chairman, Research Directing Subcommittee (1948); Chairman Project No. 14. Received Award of Merit in recognition of work done for the Society and industry.

Outgoing members of both committees include: L. C. Borchert, Dr. E. Parker, R. Racine—Research Committee. L. Morse, L. Diveley, R. Harr—Editorial Board.

New members will take office at the Cleveland Convention.

Cut not available in time for printing.
L. Morse

A. Brenner

Wm. Tucker

L. Diveley

R. Harr

S. L. Doughty

PATENT ABSTRACTS

DR. D. GARDNER FOULKE
Manager, Electrochemical Development
Hanson-Van Winkle-Munning Co.
Matawan, New Jersey

Copies of patents may be obtained by writing to Commissioner of Patents, Washington, D. C. Price 25 cents each.

No. 2,732,336, January 24, 1956—Electroplating Composition for Copper—B. Ostrow, assignor to Elechem Corporation, Jersey City, N. J.

This patent concerns bright copper plating from cyanide solutions as the result of the addition to the bath of 0.0001–5 g/l of a soluble selenium compound in combination with 0.001–5 g/l of lead or antimony. The selenium compound may be selinides, selenoureas, selenocyanates, selenites, selenates and compounds of the formula R Se H where R is an alkyl of 1–6 carbons or an aryl of 6-12 carbons.

Other claims cover the use of an alkyl polyamine also (0.25–50 g/l) with an alkyl group of 2–5 carbon atoms.

5 claims.

—AES—

No. 2,732,321, January 24, 1956—Plating Processes and Compositions—C. Gill, A. Schlechter and M. Straumanis, Rolla, Mo.

The object is immersed into fused inorganic bath containing inorganic salts and bases which do not decompose when heated to 700–1000° C and into which is introduced a plating material, such as titanium, hafnium, zirconium uranium compounds, which pyrolytically decompose at said temperature, in close proximity to the surface until an appreciable coating of said metal is formed upon said surface.

17 claims.

—AES—

No. 2,733,203, January 31, 1956—Electrolytic Silver Cleaner—D. Mason, assignor to J. McNairy, Jr., Greensboro, N. C.

A device of magnesium alloy to clip over flatware is described.

2 claims.

—AES—

No. 2,733,198, January 31, 1956—Acid Copper Plating Bath—F. Nobel and B. Ostrow, assignors to Elchem Corp., Jersey City, N. J.

An addition agent which imparts ductility and brightness to deposits from an acid copper bath consists of the resinous reaction product obtained by heating (200°F) together a substance from the class amino-thiazole and amino-thiazoline with certain aldehydes such as glyoxal, formaldehyde, adipaldehyde.

10 claims.

—AES—

No. 2,733,199, January 31, 1956—Electrolytic Treatment of Metal Surfaces—R. Wick, assignor to Bethlehem Steel Co., Bethlehem, Pa.

One object of the invention is to provide a superior base for painting. Claimed is a process for forming a non-metallic coating on a metal article in an aqueous solution of chromic acid (100–400 g/l), boric acid or borates (8 g/l to saturation) and chromium chromate (Cr. . . 2–18 per cent of total Cr in solution) with said metal article being the cathode. One claim gives the current density as 50–300 asf.

7 claims.

No. 2,732,669, January 31, 1956—Apparatus and Method of Oil Polishing—C. Conley, assignor to Houdaille Industries, Detroit, Michigan.

An assembly is described for polishing a flat metal work piece by means of an abrasive belt urged against the workpiece by a driving roll of a resiliant matrix contact portion containing a plurality of minute chambers filled with hard salt crystals. A method is provided to interpose lubricating oil between the belt and the workpiece.

8 claims, figure.

—AES—

No. 2,733,983, February 7, 1956—Method of Recovering Nickel and Cobalt from Nickeliferous Ores—J. Daubenspeck, assignor to National Lead Company, New Jersey.

The process consists of heating the ore to remove water and to oxidize the metals, chlorinating the nickel and cobalt with ferric chloride at 600°–700°C and volatilizing said chlorides at temperatures up to 1000°C to separate from other constituents.

5 claims, figure.

—AES—

No. 2,734,024, February 7, 1956—Method of Making Bearings—H. Schultz, assignor to General Motors Corp., Detroit, Michigan.

The method consists of etching the aluminum base alloy in a hot caustic solution, then further etching in an acid bath, laying down a zinc coating (by immersion from a sodium zincate bath), plating with copper from a cyanide bath to a thickness of 0.00001–0.00005 inch, and finally coplating a lead base alloy (at least 82 per cent Pb) on the copper surface.

3 claims, figure.

—AES—

No. 2,734,025, February 7, 1956—Leat-Tin Alloy Plating—E. Roehl, assignor to Pittsburgh Steel Company, Pittsburgh, Pa.

An addition agent for lead-tin fluoborate plating solution is described as a condensation product of ethylene oxide with beta naphthol in the amount of ½ g/l. About 10–15 mols of ethylene oxide are reacted with one mol of beta naphthol.

29 claims.

—AES—

No. 2,734,026, February 7, 1956—Electrodeposition of Copper Zinc Alloys—A. Chester, assignor to Poor & Company, Chicago, Ill.

The reaction product of piperonal and a 1° or 2° aliphatic amine also with hydrophillic groups such as OH–, CrOH– and SO_3Na when added to a zinc-copper (white brass) improves the brightness of the deposit. Anisic and other cyclic oxy-aldehydes may be used.

16 claims.

—AES—

No. 2,734,858, Feburary 14, 1956—Electroplating Apparatus with Current Control Means—R. Bachman, et al, assignors to Western Electric Co., Inc., New York, N. Y.

A method for controlling the thickness of electrodeposited coatings on a steel core (wire) plated continuously is described.

2 claims, figure.

—AES—

No. 2,734,859, February 14, 1956—Plating Rack—A. Reilly and J. Stocklas, Jr., assignors to Keco Plating Company, Cleveland, Ohio.

A rack is described which provides for the connection or disconnection (electrically) of individual article supporting assemblies by means of a contact pin.

6 claims, 9 figures.

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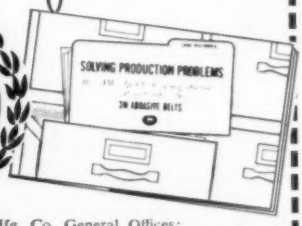

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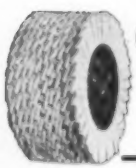

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PATENT ABSTRACTS

No. 2,735,170, February 21, 1956—Method of Producing a Multilayer Strip—C. Moffatt, assignor to Bohn Aluminum & Brass Corp., Detroit, Michigan.

Copper plated steel strip is covered with a thin layer of copper powder is heated and, while hot, is brought into contact with aluminum strip in a non-oxidizing atmosphere at a temperature below the melting point of the aluminum. The two strips are held in contact for sufficient time at a sufficiently high temperature to bond them together.

1 claim, figure.

—AES—

No. 2,735,232, February 14, 1956—Polishing Device—L. Simjian, assignor to the Reflecton Corporation, Stamford, Conn.

The object is placed in a rotatable container containing a liquid suspending abrasive and magnetic particles. A polyphase alternating magnetic field is provided to alternately vary the viscosity and to displace the particles in the mixture.

6 claims, figure.

—AES—

No. 2,735,788, February 25, 1956—Immersion Tinning—F. Lowenheim and H. Forman, assignors to Metal & Thermut Corp., New York, N. Y.

Claim 1 states "a process of forming an immersion coating of tin on the surface of materials selected from the class consisting of copper and copper-base alloys which comprises contacting the surface of said materials with an aqueous alkaline solution containing tin in the stannate condition and a cyanide." Claim six sets the approximate limits as 60 g/l of an alkali metal stannate, 120 g/l of an alkali metal cyanide and 7.5 g/l of an alkali metal hydroxide.

7 claims.

—AES—

No. 2,735,808, also 809, February 21, 1956—Mirror Bright Silver Plating—L. Greenspan, assignor to American Platinum Works, Newark, N. J.

The bath consists of a tartrate-free alkali-silver cyanide solution containing a soluble complex of an alkali metal, antimony and straight chain of polyhdroxy aliphatic compound to provide a bright silver deposit. The complex is formed by heating a boiling aqueous mixture of 1 part antimony compound (Sb_2O_3), 1-6 parts polyhydroxy aliphatic compound (sorbitol, erythritol, glycerine, etc.) The antimony content of the bath is given as 0.0015–0.7 oz/gal.

21 claims.

See also No. 2,735,809 which describes the use of similar bismuth complexes to provide bright silver deposits.

23 claims.

—AES—

No. 2,735,810, February 21, 1956—Recovery of Gold from Scrap—F. Gagliano, assignor to Secon Metals Corp., White Plains, New York.

To recover gold from gold plated articles, the plated objects are made anodic in a ferrocyanide-cyanide electrolyte in the ratio of 2:1–5:1 by weight on the basis of alkali metal or ammonium salts. The pH is given as 7.5–12, and temperature 20°–80°C.

8 claims, figure.

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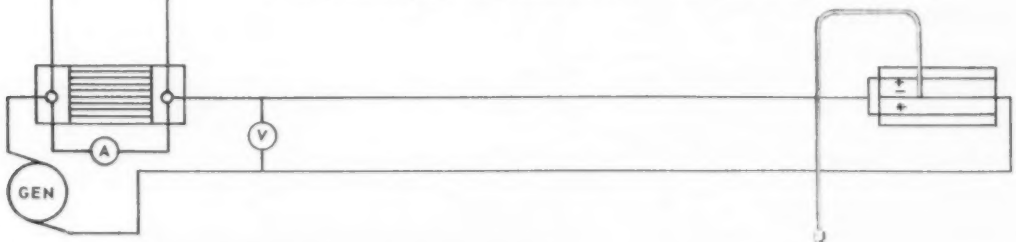

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ARTICLE REFERENCES

By
WILLIAM TUCKER
Eastman Kodak
Rochester, N.Y.

Most of the articles listed here may be obtained by writing to the Publication. Addresses are included for the reader's convenience.

82. ALLOY

a. *BRASS PLATING FROM CYANIDE-FREE ALKALINE SOLUTIONS*
S. K. Ray, H. V. K. Udupa and B. B. Dey
Journal of Scientific & Industrial Research, Vol. 14, Sec. B, December 1955, p. 652–655

83. ASTM B8 SYMPOSIUM

a. *PROPERTIES, TESTS AND PERFORMANCE OF ELECTRODEPOSITED METALLIC COATINGS*
Ezra A. Blount
Products Finishing, April 1956, p. 22–30

84. CHROMIUM

a. *PROBLEM OF MULTI-LAYER CHROMIUM PLATING (Russian)*
A. W. Sysoev and N. T. Drobantseva
Zhurnal prikladnoi khimii, Vol. 28, No. 12, December 1955, p. 1308-1313
"Comparison of cohesive strength of deposits when intermediate anodic etching and cathodic polarization are employed. Conditions for obtaining consistent homogeneous cathodic film obtained in pure chromic acid (without SO_4^- ions). Colors of films. Film can be used as anticorrosive and decorative coating for copper and steel. Micrographs, tables. 3 ref. (L17, Cr)"

b. *POROUS CHROME PLATING FOR WEAR RESISTANCE*
Glenn Pendley
World Oil, Vol. 142, February 1956, p. 98, 100

85. CONVERSION COATINGS

a. *CHROMATE CONVERSION COATINGS FOR COPPER ALLOYS*
R. Stricklen and E. L. Gabel
Metal Progress, Vol. 69, No. 4, April 1956, p. 93–96

86. CORROSION

a. *CORROSION RESEARCH LABORATORIES–9: THE CORROSION COMMITTEE OF THE ABEM*
Daniel Bermane
Corrosion Technology, March 1956, Vol. 3, No. 3, p. 72–75

b. *GALVANIC CORROSION OF ALUMINUM*
Fred Pearlstein
Metal Finishing, April 1956, Vol. 54, No. 4, p. 52–57

c. *CORROSION—A TWO-FRONT WAR*
Chemical and Engineering News, April 16, 1956, p. 1922–1924

87. ELECTROFORMING

a. *SOME TIPS ON ELECTROFORMING*
Marv Rubinstein
Metal Finishing, April 1956, Vol. 54, No. 4, p. 58–60

88. GOLD

a. *METALLIC COATINGS ON NON-METALLIC MATERIALS. VI. GOLD FILMS*
Industrial Finishing (London), Vol. 9, December 1955, p. 269–270, 272

89. MISCELLANEOUS

a. *TRY FLAME-TESTED COATINGS WHERE SERVICE IS SEVERE*
M. A. Teter
Materials and Methods, February 1956, Vol. 43, No. 2, p. 100–102

90. NICKEL PLATING

a. *LEVELLING IN BRIGHT NICKEL PLATING SOLUTIONS*
K. E. Langford
Electroplating and Metal Finishing, March 1956, Vol. 9, No. 3, p. 71–76

91. ORGANIC MATERIALS

a. *REPORT ON RIGID POLYVINYL CHLORIDE*
Corrosion, Vol. 12, No. 4, April 1956, p. 45–48

b. *REPORT ON EPOXY RESINS*
Corrosion, Vol. 12, No. 4, April 1956, p. 49–52

c. *REPORT ON APPLICATION TECHNIQUES, PHYSICAL PROPERTIES AND CHEMICAL RESISTANCE OF CHLORINNATED RUBBER COATINGS*
Corrosion, Vol. 12, No. 4, April 1956, p. 53–57

92. POLISHING

a. *TIPS ON CUTTING COSTS WITH ABRASIVE BELTS*
Warren K. Seward
Products Finishing, April 1956, p. 36–44

93. STRESS

a *STRESS IN ELECTRODEPOSITED COATINGS, ITS SIGNIFICANCE AND MEASUREMENT*
Joseph B. Kushner
Metal Finishing, April 1956, Vol. 54, No. 4, p. 48-51, 57

94. TUNGSTEN

a. *THE ELECTRODEPOSITION OF TUNGSTEN*
G. L. Davis and C. H. R. Gentry
Metallurgia, Vol. 53, No. 315, January 1956, p. 3–16
"Experimental data and theoretical aspects of deposition from aqueous solutions and organic solvents, with special attention to deposition from fused salt baths containing borates and tungstic oxide. Micrographs, tables, graphs, diagram, 49 ref. (L17, W)"

The following are metallurgical abstracts included in The Journal of the Institute of Metals, February 1956, 4 Grosvenor Gardens, London, S.W.1:

95. CORROSION

a. *CORROSION-RESISTANCE OF TITANIUM IN HYDROCHLORIC AND SULPHURIC ACIDS*
Warren W. Harple
Materials and Methods, 1954, 40 (5), 106–108

96. ELECTRODEPOSITION

a. *DISTRIBUTION OF METAL ON THE MICRORELIEF OF THE CATHODE SURFACE*
L. I. Kadaner
Trudy Soveshchaniya po Elektrokhimii 1950, 1953, 421–430 (in Russian).

b. *PASSIVATION PROCESSES IN ELECTROPLATING*
P. P. Belyaev
Trudy Soveshchaniya po Elektrokhimii, 1950, 1953, 455–463 (in Russian)

97. TITANIUM AND ZIRCONIUM

a. *SOME ASPECTS OF THE ELECTRODEPOSITION OF TITANIUM AND ZIRCONIUM COATINGS*
R. M. Creamer, D. H. Chambers and C. E. White
U. S. Bur. Mines, Rep. Invest., 1954 (5093), 39 pp.

Chemical and Engineering News
American Chemical Soc.
1155 Sixteenth St., N.W.
Washington 6, D. C.

Corrosion
1016 M & M Bldg.
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Metal Progress
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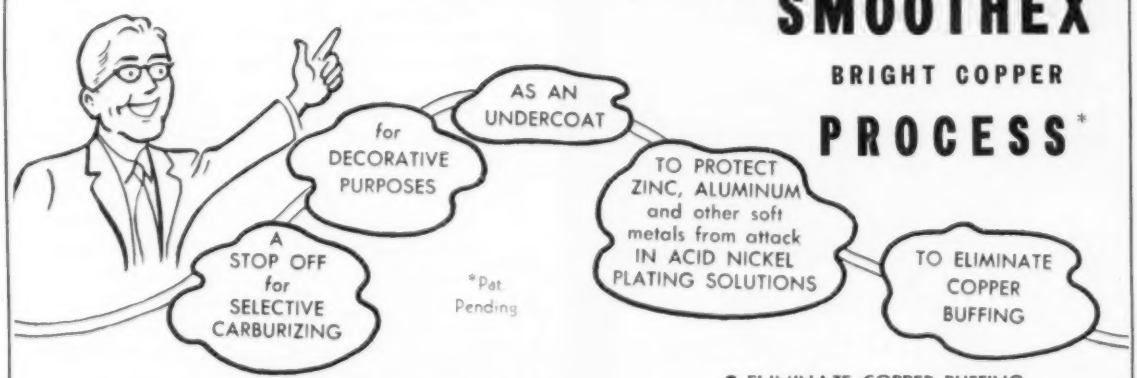
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Twenty-five Years Ago

Twenty-five years ago the "Monthly Review" for June 1931 was called the "Convention Issue," and carried a picture of the President, George Gehling. The cover stock was different than usual, it being a coated stock of better quality. The president's letter dealt with the coming convention as did the entire book. A picture was carried of the hotels in Rochester. Annual reports were included in the issue by R. P. Lopez, second vice-president; the founder of the AES, C. H. Proctor; R. J. O'Connor, first vice-president; H. H. Smith, past-president and H. A. Gilbertson, secretary-treasurer. The Society reported that their receipts for the year amounted to $2504.20 and that they had expended $1115.33. The total membership amounted to 1554. Dr. W. Blum had an article on "The Relation of the AES to Other Organizations." There was a report by A. Hirsch, chairman of the Bureau of Education; another by W. J. R. Kennedy, editor of "Monthly Review." The Research Chairman, Jacob Hay, exhorting the membership to help in the matter of the research program. There were three technical articles in this issue and some twelve branches reported exhaustively on papers delivered before one of their meetings. This issue of the "Monthly Review," exuded the magnificent esprit and the thoroughly serious approach to the science and art of our industry which have made the AES what it is today. These are our antecendents. We must work hard and live up to them.

Ten Years Ago

TEN years ago the June issue of the "Monthly Review" was the "let-down" issue. The convention had been held the month before and the June issue was limited to 100 pages including covers. L. F. Oeming authored an article on "Stream Pollution Problems." R. S. Herwig wrote one on "Black Anodic Coatings on Aluminum Alloys." D. Wininger authored still another called "Cyclic Plating of Hard Chromium on Turbine Rotor Journals." There was an AES Research Report for Project 3 by A. L. Ferguson and a letter from the Adelaide Branch President.

This issue contained 44-pages of ads which were stacked for the most part. In all, the appearance would be a breather between two somewhat more prosperous issues.

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For fast, heavy-duty cutting on hard metal having contoured surfaces, choose flexible, strong, long-wearing new SISAL-FLEX Buffs! Overlapped SISAL-FLEX construction means cool running, no streaking, unusual pliancy. Check these features:

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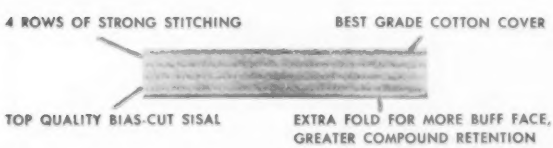
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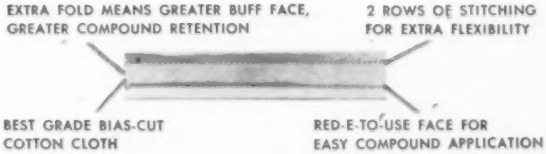
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Motions are treated in 24 separate sections. By-laws, Committees, History, Minority, Rights, Nominations, Officers, Order of Business, etc. are all aptly covered.

With the booklet is supplied a separate little chart, printed on double-coated heavy paper and called, "Parliamentary Guide." With this, any chairman can tell at a glance the order of precedence of motions. A very handy gadget to hold close at hand when at a meeting.

In effect, this is a booklet that every Branch Secretary should have, and it would seem to be a "must" in any sort of organizational work. Nor is it limited in any sense to people who expect to be chairmen, for in this booklet can be found the rights of the individual, minority rights, procedures, etc. It tells you when you have a right to speak, whether or not you are in order, how to make a motion, what to do when you are on a committee and how a minority can keep from being "steam-rollered."

Traité de Galvanoplastie by J. Salauze. 819 pages; $12.00; AES members, $10.20. (Reviewed by Dr. E. Saubestre)

The third edition of the late Professor Salauze's "Testbook of Electroplating" will be the last in this series of excellent reference works in the French language. This book, the bible of French electroplaters, has no exact parallel in U. S. books on electroplating. Its format is strikingly similar to that of Blum and Hogaboom, consisting of a discussion of theory and fundamentals of electroplating, inspection of deposits, preparation for plating, equipment, and finally, chapters on the individual plating baths. Salauze's text, however, is unique in that the discussion on theory is far more detailed and advanced in context than corresponding U. S. texts on electroplating. Salauze's theoretical section amounts to a brief condensation of the Kortum-Bockris "Testbook of Electrochemistry," with special reference to electroplating aspects. This section covers dissociation, transport, conductivity, Ostwald's and Nernst's equations, EMF, polarization, throwing and microthrowing power, overvoltage, and *p*H. The next portion of the text covers theory of deposition and influence of plating parameters on the deposit. The latter chapter contains an excellent 23 page section on the influence of addition agents which has no equal in U. S. literature. Sections on surface preparation, equipment and inspection of deposits are followed by chapters devoted to the individual baths.

The individual baths are covered in far more detail than in Blum and Hogaboom (448 pages to 139 pages), but the coverage is subjective. Baths favored by Salauze are given intensive coverage, others are slighted or ignored. In general, literature references are less complete than in Gray's "Modern Electroplating," but are more critically selected.

The revision of Salauze's text is up to date on the whole, and many recent references are to be found. It is particularly surprising to note the large number of recent U. S. references and the thorough coverage of the latest references to PLATING Magazine. In describing the properties of various solutions, Salauze does not hesitate to give proprietary names and in this connection it is again surprising to note the inclusion of several U. S. proprietary processes which have been on the market for only two or three years.

Some outstanding sections of the book include that on addition agents referred to above, and others on inspection of deposits, cyanide silver, nickel plating (including a very complete coverage of electroless nickel), and chrome plating. This book is less a text or reference work than it is a monument to Salauze's view of electroplating. As such, it has certain advantages over multi-authored books as "Modern Electroplating." Salauze's book is highly readable, has very little repetitious matter and follows a very logical order. Photographs, graphs and tables are numerous and generally well chosen. On the debit side, the individuality of this book results in occasional distortions. This is especially noticeable in the section on theory of deposit formation which presents only one theory and virtually ignores all others, and in the choice of plating baths. For example, lead has 19 pages to 1 for indium, gold has 25 pages to 4 for all the platinum group metals, whereas "Modern Electroplating" offers better balance. Some important topics are poorly presented or omitted, such as plating on nonconductors, plating on aluminum, displacement plating, electroforming, and alloy plating.

Typography and reproductions are good, except that equations and formulas are sometimes awkwardly set. References are fairly thorough, but those in non-French journals are quite often inaccurate. For those who read French, this work should be a valuable reference. Highly recommended for larger industrial and academic libraries.

The Surface Treatment and Finishing of Aluminum and Its Alloys by S. Wernick and R. Pinner. 580 pages; $12.00; AES members, $10.20.

The technology of the surface treatment and finishing of aluminum has moved at such a pace that it is virtually impossible to treat the subject adequately in a single volume of normal size.

Here is presented a long-needed detailed survey of the subject. The book, in itself, is comprehensive and is completely arranged. It covers the whole field such as conversion coatings, treatment preparatory to specialized treatment methods, anodizing, dyeing, electrodeposition and so on through mechanical surface treatment finishing, polishing, cleaning, hardened anodizing, hard chromium plating, etc. There are 104 tables and 189 figures included in the vast amount of information.

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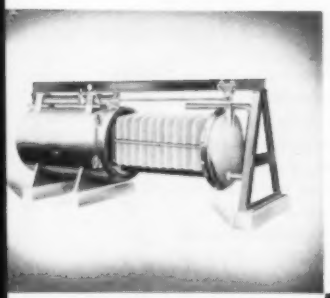

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Ask for Bulletin 100

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New operating convenience for smaller filtration jobs. Ideal for polishing liquids, as a trap filter and as a scavenger for larger filters the cost is less than a scavenger plate. This filter's "inside-out" flow system and the use of simple filter paper liners makes it unusually easy to operate.

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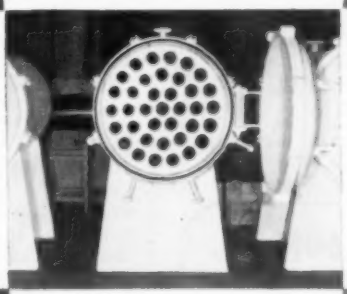

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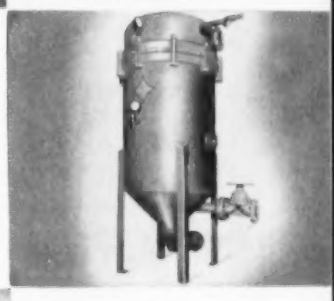

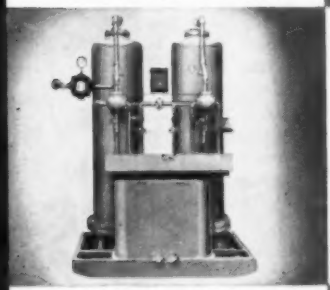

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With operating costs figured in pennies per thousand gallons, Industrial ion exchangers are specially built for water purification, waste treatment, metal recovery and other solution treatments.

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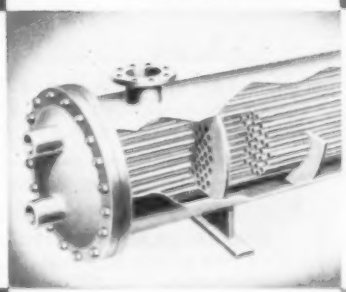

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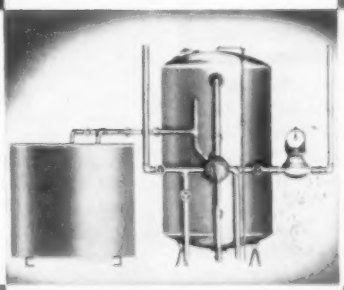

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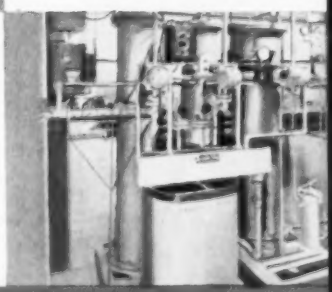

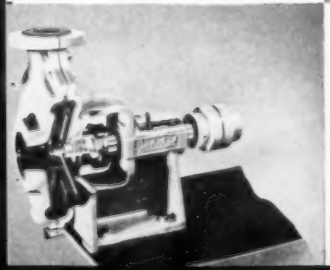

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BULLETIN 300

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DEAR SIR:

It is with deep regret that I read of the passing on of my esteemed friend Thomas F. Slattery. I had known Tom for 46 consecutive years having met him and his wife Loretta at a New York AES Branch banquet in Feb. 1910.

When I was Secretary-Treasurer of Bridgeport Branch AES, in 1915, and employed as foreman electroplater at the plant of a large shear and scissor manufacturer, I saw Tom at the meetings each month. I visited his home often in Bridgeport and talked over our plating problems. Tom at that time was foreman plater at the plant of a piano hardware manufacturer. All through those 46 years we had corresponded with each other and exchanged Christmas greetings.

Royal F. Clark, Sr.,
Charter member of the AES,
and Honorary member of
Newark Branch

DEAR SIR:

Will you please send all future copies of PLATING magazine to above address. Some copies have not arrived at other address.

I enjoy your publication which is informative, and practical considerations are not neglected.

One of these days I hope somebody will write a humorous article about the job shop platers, the strange theories held by some operators and solution of cleaning problems, including dewitching procedures.

This, especially now as it seems the industry is at a cross-roads and about to enter an era of automation. Perhaps in a short period we will no longer have to start Monday mornings with *cold* nickel plating tanks, our foreman nursing a hangover and the chemist is not very bright either.

Maybe someone will devise a mathematical marvel to take over and adjust conditions, pH and temperature, until the foreman and chemist are feeling better and the bright nickel is like a platers' dream.

Heres hoping,
William Finn
Cicero, Illinois

DEAR SIR:

I am indeed grateful to you for your letter of 1st March enclosing a copy of the AES Branch Officers' Manual received a few days ago.

I am most impressed by the care and thought which has been devoted to its compilation and the comprehensive coverage which it provides of the many factors involved in the progressive and efficient running of an organisation such as the AES or the IMF.

We are, of course, a much smaller body than the AES but a great deal of the material in the Manual could be usefully applied to our Institute. I propose therefore to circulate the Manual first to the members of our executive committee and will recommend that it is then circulated to all chairmen of branches prior to being filed with our headquarter records.

May I conclude by saying on behalf of my Council how much we appreciate your courtesy in sending this Manual which we value not only for its useful contents but as a token of the close link which exists between our respective Societies.

Sincerely yours,
R. A. F. Hammond
President
Institute of Metal Finishing,
London, England

[This is one of many letters received by Dr. Samuel Heiman, "father" of the Branch Officers Manual.]—Ed.

DEAR SIR:

We take this opportunity of asking you to pass on to any members of the Society who may be in Melbourne for the Olympic Games that the members of the Society here will be only too pleased to see them, and that we will do all in our power to make their stay an enjoyable one. So, anyone who is coming please let the committee know so that we can do our best for you, the pleasure will be ours.

Yours sincerely,
American Electroplaters' Society
Melbourne Branch
B. D. Reaburn
Hon. Secretary-Treasurer

DEAR SIRS:

By some mischance, my December 1955, copy of PLATING did not arrive and, as I should not like to miss it, I am wondering whether you might have a spare copy you could send me. If so, I should be much obliged.

I should like to express my admiration of the current presentation of PLATING, which now seems to me to be outstanding among both finishing and society publications. I have been particularly impressed by the covers, as I have some idea of the problems involved in arriving at a stylized rendering of some aspect of plating processes, but I also find the layout of the articles themselves to be admirable.

Yours sincerely,
I. S. Hallows
Editor
Product Finishing

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Controls — Rapid INDUCTROL provides fully-motorized oil immersed, continuously variable control. Close control of power output is accomplished by depressing two buttons, varying power from zero to full rated load.

Copper Output Bus — All copper output bus bars, and interior copper conductors are designed with an amperage carrying capacity of no less than 1000 amperes per square inch. An anti-corrosive compound is used to safeguard the entire length from corrosion.

Fan Motors — Forced-air cooled units employ ball-bearing motors of the self-lubricating type. Excessive wear and costly maintenance is thereby reduced.

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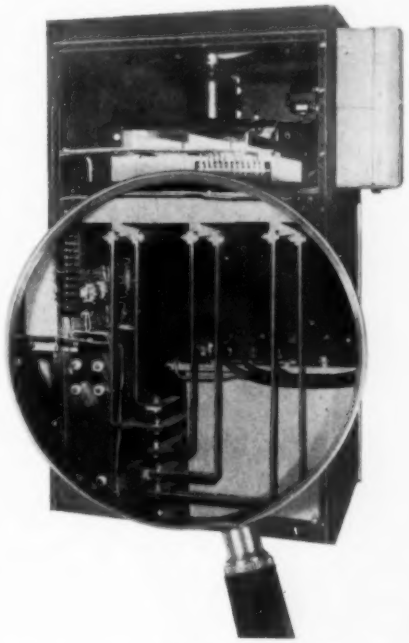
Meters — First-line, quality meters, have an accuracy of 2%, and are standard equipment on all RAPID models. By an exclusive patented process, Rapid manufactures its meter-shunts with an accuracy of ½% over a temperature range of 0.180° C. Designed with a low temperature coefficient, a high heat dissipation is the result. Calibration remains constant under extreme shock or stress, due to its unusual mechanical strength and stability.



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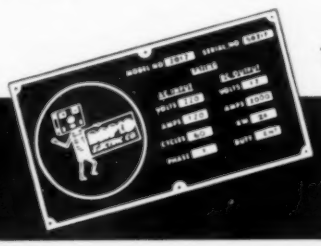

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INTERSOCIETY NEWS

NAMF TO MEET IN WASHINGTON JUNE 17—18

The National Association of Metal Finishers has announced that it will hold its Annual Meeting and the Fifth Management Seminar on Sunday and Monday, June 17–18, 1956, at the Mayflower Hotel, Washington, D. C. The meetings are being held in conjunction with the Annual Convention of the American Electroplaters' Society.

The Annual Meeting of the membership at 9:00 A.M. on Sunday, will be followed on Monday by the all-day Management Seminar, during which four sessions and a banquet are scheduled, with talks on topics of interest to the owners and operators of job-shop metal finishing companies and the managers of finishing departments of manufacturing plants.

Included in the sessions starting at 1:00 P.M., June 18th, will be the subject of Waste Disposal Legislation, by William Acks, assistant general manager, Bechtel-McLaughlin Corp., Sandusky, Ohio; Labor Relations Problems, by Robert L. Giesel, president, Adolph Plating, Inc., Chicago, Ill.; Work Simplification for the Job-Shop, by S. J. Fecht, president, S. J. Fecht & Associates, Chicago and New York; and General Shop Operating Problems by Silvio C. Taormina, director, Platers Technical Service, New York and Chicago, and technical advisor to the Association.

Giesel

Palik

Beginning at 6:30 P.M., the group will assemble for cocktails and dinner, at which time the key speaker will be a representative of small business interests in Congress. Subject of the Congressman's talk will be the current shortage of nickel metal, and the relationship between Congress and small business.

John Palik, Jr., president of National Plating Corp., Cleveland, Ohio, and the Association's president, has announced that the registration fee for the Seminar, including cocktails and dinner, will be $10.00 per person.

ASTM SELECTS REED AS ITS 1956 MARBURG LECTURER

Charles E. Reed, general manager, Silicone Products Cept., General Electric Co., Waterford, N. Y., will deliver the thirtieth Edgar Marburg Lecture at the 59th Annual Meeting of the American Society for Testing Materials at Chalfonte-Haddon Hall, Atlantic City, N. J., at 4:30 P.M., Wednesday, June 20.

This lecture originated as a memorial to the first secretary of the Society and was established to emphasize the importance of furthering our knowledge of properties and testing of engineering materials.

In his lecture entitled "The Industrial Chemistry, Properties and Applications of Silicones," Dr. Reed will discuss the basic chemical structure of silicones with particular reference to their similarities and differences compared with other industrially important polymeric substances, and the physical and chemical properties of silicones leading to their industrially important applications. He will then take up processes of manufacture, the important types of silicones and their applications, ending with a look into the future of silicones in selected industries such as electrical, aircraft, protective coating, and textile.

ASTM SELECTS CRAMPTON

D. K. Crampton, director of research and development, Chase Brass & Copper Co., Inc., Waterbury, Conn., will present the fifth Gillett Memorial Lecture at the 59th Annual Meeting of the American Society for Testing Materials, on Tuesday June 19. His subject will be "Structural Chemistry and Metallurgy of Copper."

This lecture, jointly sponsored by ASTM and Battelle Memorial Institute, commemorates Horace W. Gillett, the first Director of Battelle and one of this country's leading metallurgists. Each year it covers a subject pertaining to the development, testing, evaluation, and application of metals.

In his lecture, Dr. Crampton will explore three aspects of the microstructure of copper. The first portion will cover some new work on recrystallization and grain growth of copper alloys, investigating time intervals much shorter than have been used heretofore. In the second portion, the lecture deals with the structural chemistry of copper alloys and more particularly the relation of grains and grain boundaries both in pure copper and some copper alloys. Lastly, Dr. Crampton will describe new investigations of the fundamentals of corrosion and corrosion resistance of copper and some of the factors affecting the incidence growth of corrosion pits.

Button

NSMPA ELECTS OFFICERS

Clarence A. Button, assistant to the executive vice-president of the Mueller Brass Company, Port Huron, Michigan, has been elected president of the National Screw Machine Products Association at its annual meeting in Milwaukee.

Elected vice-president was Dana B. Jefferson, Jr., president of the Walker Manufacturing Company, Medfield, Massachusetts. The Association's new treasurer is Leonard R. Schaffer, president and treasurer of Mechanical Art Works, Inc., Newark, New Jersey.

Orrin B. Werntz was re-elected executive vice-president of the Association whose headquarters are in the NSMPA Building, Cleveland. He also serves the organization as its Counsel. Margaret S. Ballinger, who is starting her 15th year with the Association, was re-elected secretary.

New directors who were elected by their districts to serve three-year terms include E. E. Sandifar, president of Omco Products Corporation, Springfield, Ohio; William R. Knowles, assistant sales manager, New Britain Machine Company, New Britain, Connecticut; Loren Willhoft, executive vice-president and general manager, Micro Products Corporation, St. Louis; and Charles R. Harvin, president, Harvin & Company, Kenilworth, New Jersey.

NORTH CENTRAL REGIONAL MEETING SCHEDULED

The National Association of Corrosion Engineers announces a North Central Regional meeting is to be held at the Statler Hotel in Detroit, November 15-16, 1956.

This is the first full meeting of the more than 1000 members of this region. With more than 100 members in Detroit and others coming from the region bounded on the west by Montana and Wyoming, on the south by Missouri and on the east by Ohio, an attendance of several hundred is expected.

The conference headed by general chairman, Walter Cavanaugh, of Parker Rust Proof Company, will include speakers of authority and discussions of corrosion in four business fields—automotive, utilities, chemicals and construction.

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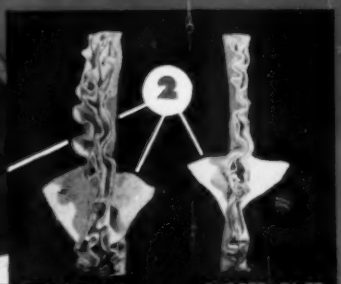

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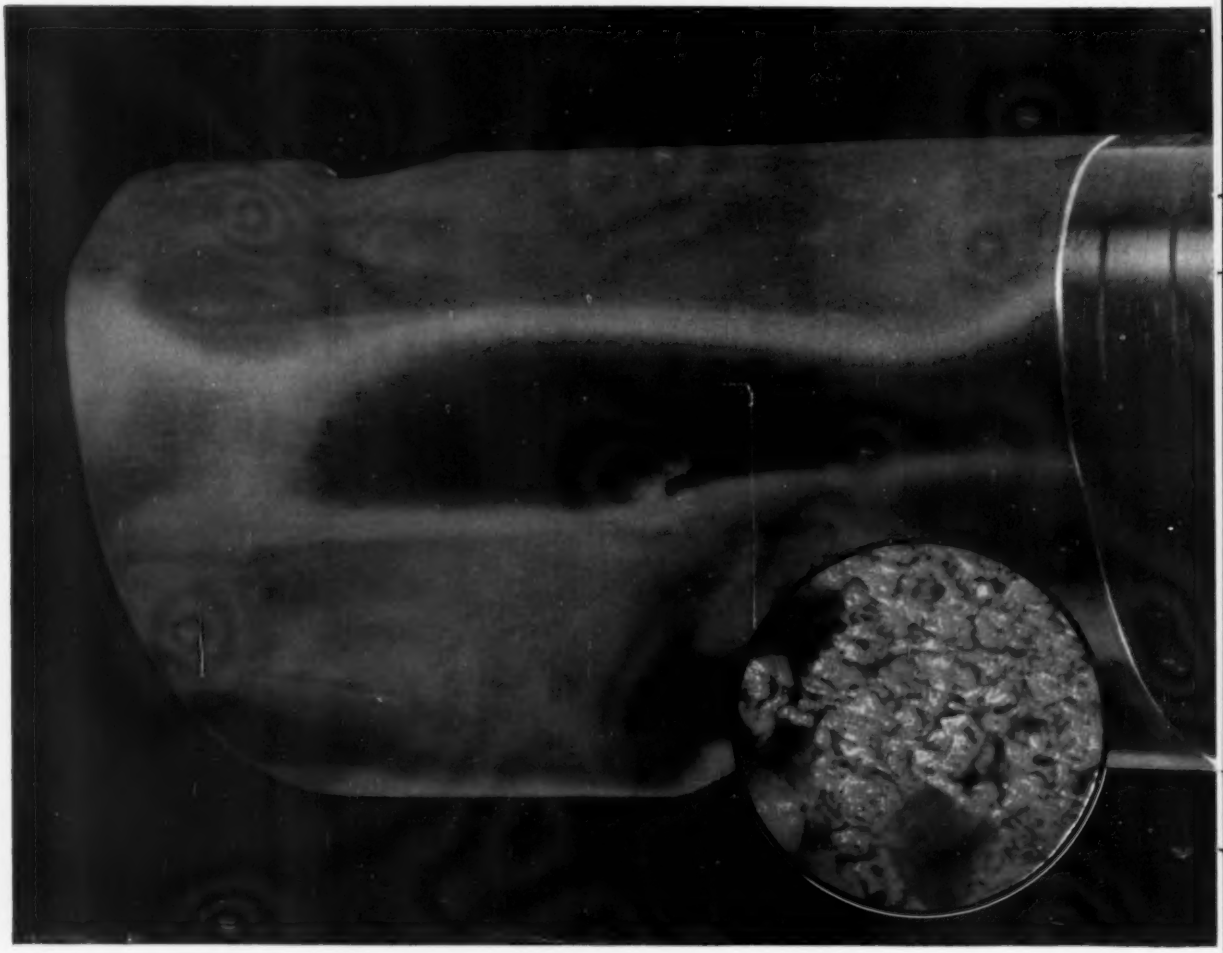
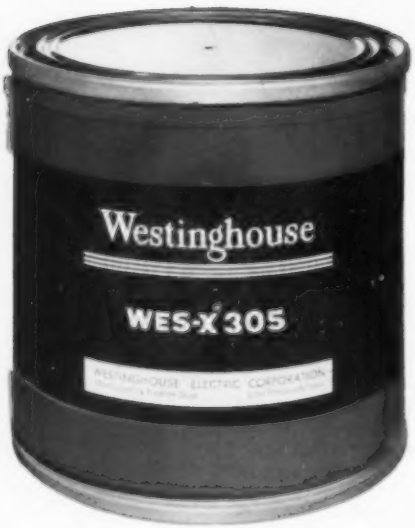
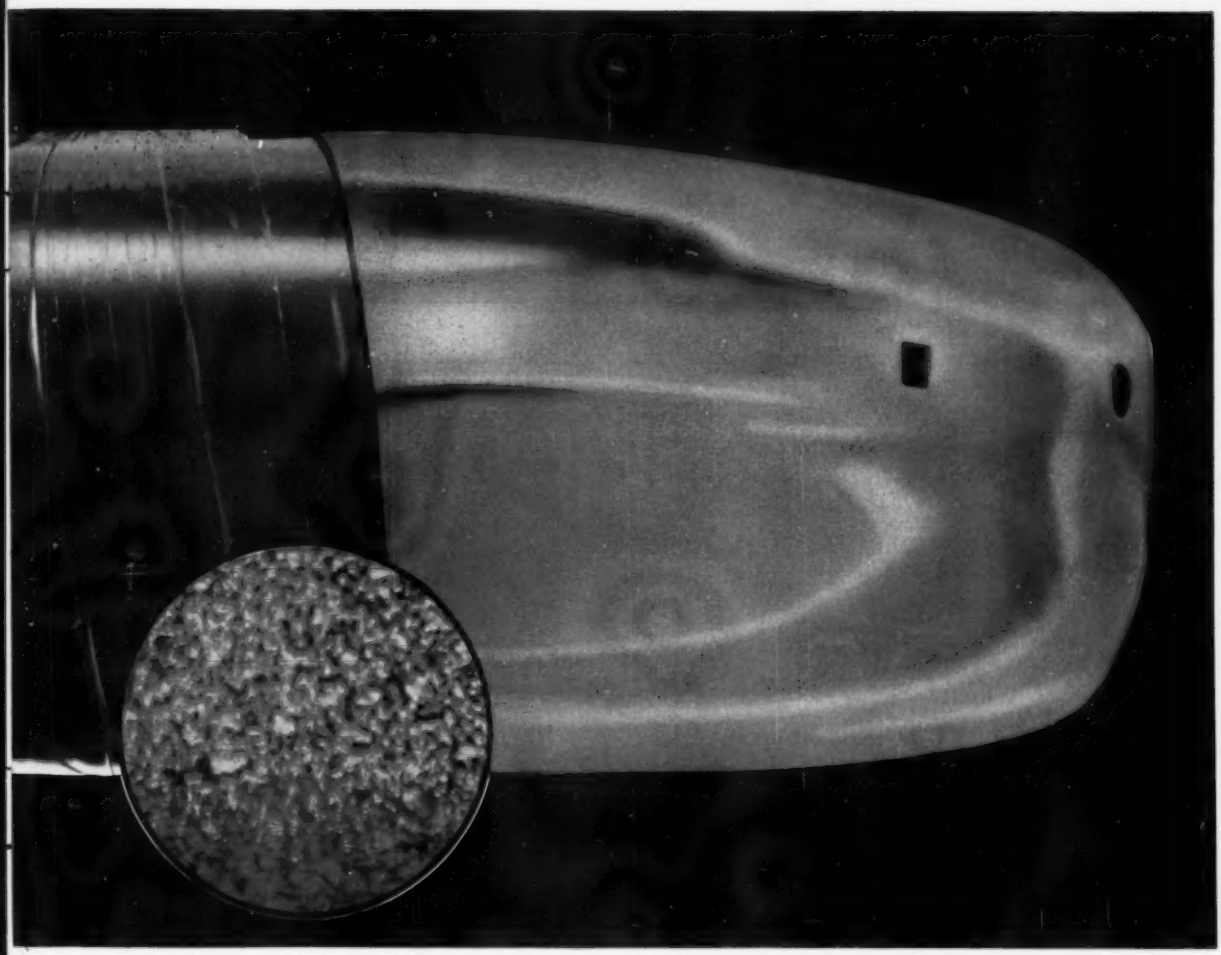




You can speed up

Wes-X 305 makes the difference. The two ends of this automobile bumper part were plated by the acid copper process at the same current density (175 amperes per square foot). The section shown on the left was plated with the addition of a normal acid copper addition agent . . . note the burning and coarse grain on the ordinary plating . . . and the smooth, fine-grain, burn-free, uniform deposit on the Wes-X 305 section shown on the right.



plating and maintain quality, too

. . . with Wes-X® 305 acid copper additive

A production bottleneck can be broken in many instances by simply speeding up plating operations. However, plating speed-up normally results in burned and coarse-grained deposits not tolerable for decorative finishes.

Now, as the illustration shows, speed-up *is* possible, without quality loss, by use of Wes-X 305 additive. Maximum allowable current density is 25% to 50% greater — 50 to 100 amperes per square foot.

Wes-X 305 solutions are easy to control. Wetting agents are not necessary. Quality of finish is not affected by changes in concentration of solution constituents. Chlorides present no problem.

For more details about Wes-X 305, and its companion additives for other plating advantages, call your Westinghouse sales engineer — or write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-10452

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When you deal with Federated sales and service engineers you'll find their talk of extra service is more than just lip service. As an example, Federated provides free bath analysis for plating shops that wish to use Zimax, the efficient addition agent for zinc plating; and free adjuster solutions are provided with Cadmax, Federated's effective brightener for cyanide cadmium plating, so that no break-in period is required.

Federated provides a well rounded line of quality plating materials and electrochemicals:

ANODES:

All types of copper; zinc; tin; tin-lead; cadmium; brass; silver and lead anodes, including the famous Conducta-Core that lasts three times as long, gives greater throwing power.

NICKEL SALTS:

Domestic nickel salts produced under quality control methods that assure identical plating characteristics from every lot.

ADDITION AGENTS:

Zimax and Cadmax provide maximum throwing power, maximum coverage, maximum allowable current density, maximum brilliance and maximum lustre.

Talk to your Federated dealer or sales engineer to convince yourself that Federated's knowledge and nation-wide facilities can help increase shop efficiency and add to your profits.

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INTERSOCIETY NEWS

NATIONAL ELECTRONICS CONFERENCE IN CHICAGO

More than 100 technical papers and 235 commercial exhibits will be featured at the 12th annual National Electronics Conference this year.

A record attendance of 10,000 is expected at the three-day meeting—the nation's leading forum on electronic research, development, and application—scheduled for the Hotel Sherman in Chicago on October 1-3.

Robert R. Jenness of Northwestern University has been elected president of the 1955 National Electronics Conference.

Other officers are: Karl E. Rollefson, Muter Co., executive vice-president; John M. Gage, Purdue University, chairman of the board of directors; John S. Powers, Bell and Howell Co., executive secretary; Elmer H. Scheibe, University of Wisconsin, secretary; Howard H. Brauer, Bell and Howell Co., treasurer, and Charles W. McMullen, Northwestern University, assistant treasurer.

The conference is sponsored each year by American Institute of Electrical Engineers, Institute of Radio Engineers, Illinois Institute of Technology, University of Illinois, and Northwestern University.

Participating also in the conference are Michigan State, Purdue, Michigan and Wisconsin universities, and Radio-Electronics-Television Manufacturers Association, and Society of Motion Picture Television Engineers.

ARMSTRONG ELECTED PRESIDENT OF COPPER AND BRASS DISTRIBUTORS

H. C. Armstrong, president of Williams and Company, Pittsburgh, was elected president of the Copper and Brass Warehouse Association at the organization's recent annual meeting in Phoenix, Arizona.

Armstrong succeeds Herbert Barchoff, president of the Eastern Brass and Copper Company, New York, as chief executive of the group.

Other officials named are: George D. Potter, Corey Steel Company, Cicero, Illinois, vice-president; Norman Rosow, president of the New York Brass and Copper Company, secretary; and Albert I. Gordon, president, Clifford Metal Sales Company, Providence, Rhode Island, was elected treasurer.

7TH NATIONAL PLASTICS EXPOSITION

The 7th National Plastics Exposition of the Society of the Plastics Industry, Inc., will be held June 11 to 15 at the New Coliseum in New York City

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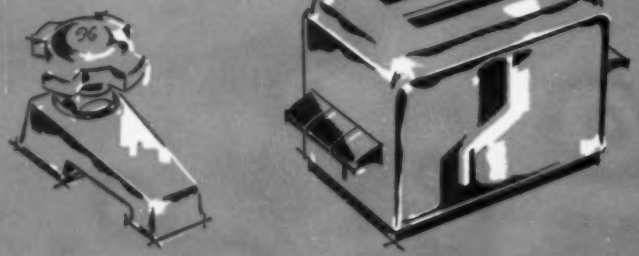

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INDICATE B 615.

Meet Mr. President

Joe McInerney, the personable and popular president of the Hartford Branch, has been a beaver for work in this very active AES unit.

McInerney
Hartford Branch

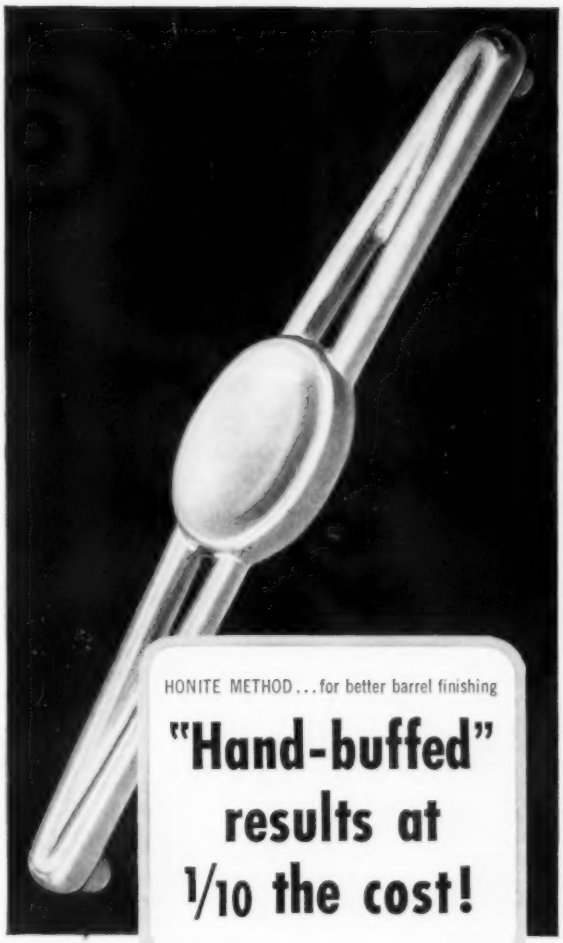
To start Joe's history from the very beginning, he was born in Meriden in 1913. Incidentally, he was born around the corner from where Past President Logozzo was born and just a few months later. Art and Joe were playmates for about ten years. After going in different directions for many years they were reunited in the Hartford Chapter of AES.

Joe attended public schools in Meriden and then took some extension courses at University of Connecticut. He studied metallurgy under Dr. Egeberg of International Silver Company and Henry Smith of R. Wallace & Company. He worked in silver plating at the International Silver Company from 1929 through 1935.

He then went into the family retail coal business for eight years. During World War II he fought for Gen. Patton's 3rd Army as a staff sergeant and took part in the "Battle of the Bulge." He was also in the unit that relieved the "Battling B———'s of Bastogne."

After service, Joe went back to plating at the Blackinton Silver Company in Meriden from 1945 to 1952. In 1952 he transferred to the M. S. Little Company in Hartford where he handles their automatic plating units on copper-nickel-chrome.

He has been a member of the AES for eleven years and been active as an officer in Hartford Branch for ten of these years. He started out on special committees, then treasurer, followed by all offices in their proper sequence. Joe has also helped build the New England Regional during the last few years.



This die-cast aluminum handle for furniture is one of several thousand processed each month by a Cincinnati, Ohio manufacturer. The handles must be given a super-smooth finish prior to plating—a job formerly done by rough finishing with a competitive barrel finishing abrasive, then *hand* buffing to produce the desired finish. The hand buffing cost was prohibitively high.

Recently, this company switched to the HONITE Barrel Finishing Method, using a 2-step process—cutting with Regular HONITE Chips and HONITE Micro-Cut Compound, then polishing with HONITE Multi-Burnish Compound.

This method produces the same quality finish as hand-buffing, at 90% lower cost!

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INDICATE B 616.

AES NEWS

AES CONVENTION MANUAL RELEASED

A 52-page convention manual was released recently by National Headquarters to a small group of reviewers, including the Baltimore-Washington and the Montreal convention committees. Prepared by Dr. Samuel Heiman, manual editor-in-chief, and Manson Glover, editor, the manual contains a breakdown of the duties and functions of the various committees as well as exhibits.

The purpose of the manual is to serve as a guide in the mechanics of planning and operation of annual conventions. Final draft of the manual should be ready within the next few months.

Cooperating in the writing of the initial draft were the following: I. W. Marcovitch, W. H. Trusdell, C. J. Wilmore, A. H. Pope, D. Volino, C. B. Ricca, F. Fulforth, E. F. Ottens, C. E. Boerckel, Mrs. D. R. Robson and C. Kelly.

REPORT ON FIFTH INTERNATIONAL CONFERENCE

No meeting of the International Conference Committee has been held. In fact there has been little or no correspondence. All that has been determined is that the Fifth International Conference will be held in Detroit, Michigan in 1959. The people from Europe decided to have Detroit to be the site of the Conference because it is centrally located and is, of course, a center of electroplating.

There will probably not be much activity on the International Conference until 1958.

LOS ANGELES, MONTREAL, AND SOUTHEASTERN WINNERS IN 1955–1956 MEMBERSHIP COMPETITION

Los Angeles, Montreal and Southeastern are winners in the 1955–56 branch membership competition concluded March 31. The 12-month drive brings AES totals to another all-time high.

Total membership as of March 31, 1955—including 341 Sustaining Members, 210 Members-at-Large and 6,532 Branch Members—is 7,083. This is an over-all increase of 165 members over the previous fiscal year, or a 2.3 per cent gain. Branch membership increased 85 members or a gain of 1 per cent over 1954–55, while Membership-at-large was increased by 49 members or a net gain of 30.4 per cent.

The three winning branches will receive an award of $50 each at the forthcoming convention in Washington in recognition of their achievements.

First five leaders in each division are listed below:

BRANCH MEMBERSHIP COMPETITION

First Division (126 members and over)

BRANCH	Members Apr. 1, 1955	New Members	Net Change Membership	Per Cent Change
1. Los Angeles	272	31	+34	+12.5
2. Toronto	149	26	+15.5	+10.4
3. Waterbury	134	14	+ 9.5	+ 7.1
4. Milwaukee	178	22	+ 9	+ 5.1
5. Cleveland	260	21	+12.5	+ 4.8
Second Division (70–125 members)				
1. Montreal	78	15	+11	+14.1
2. Cincinnati	89	19	+11.5	+12.9
3. Buffalo	93	21	+11.5	+12.4
4. St. Joseph Valley	81	13	+ 9	+11.1
5. Dayton	92	12	+ 6	+ 6.5
Third Division (10–69 members)				
1. Southeastern	52	23	+18	+34.6
2. Hamilton	26	5	+ 4.5	+17.3
3. Seattle-Puget Sound	35	8	+ 6	+17.1
4. Western Ontario	29	3	+ 3.5	+12.1
5. Dallas Ft. Worth	48	6	+ 5.5	+11.5

AES MEMBERSHIP REPORT

Allentown-Reading: G. Andres, J. Hepler, I. Miller, G. J. Oswald, W. J. Weder

Cincinnati: L. Alfrey, H. A. Campbell, H. E. Follmer, M. Green, C. R. Konecny, L. Major

Cleveland: J. A. Bell, A. E. Benic, C. De Noewer, L. Gionelos, E. Kostir, K. A. Prentice, S. Weintz, Jr., J. B. Wheeler, N. C. Youngs

Dayton: B. O. Eley, R. H. Wolf

Detroit: D. J. Agresta, R. E. Champe, W. J. Franke, J. E. Froehlich, E. F. Iabell, R. Jankowski, A. A. Johnson, J. H. Munger, A. W. Reckling, Jr., E. J. Schultz

Grand Rapids: G. Kapphahn, C. H. Kelley, O. Klingenmaier, K. Martinus, F. R. Selzer, G. Thompson, F. E. Winters

Hartford: J. C. Goddard

Indianapolis: F. W. Adams, F. L. Maker, M. E. Steuernagel

Los Angeles: C. Cook, P. L. Greathead, M. L. Maroney, J. W. Schultz, G. T. Sink, W. P. Thomas, M. H. Yardley

Melbourne: A. J. Barratt, J. K. Christian, R. W. Feben, F. W. Harbour, B. Ogle, G. Partell, L. A. Stewart

Newark: H. Bauer, I. Bernstein, R. Corsini, H. Heuring, D. V. Hillegass, B. Marsilio, A. Miller, W. E. Pfachler, W. Riccardo, R. Sileneck, H. Sloan, G. C. Van Tilburg, J. G. Vouglas

New York: P. Andros, B. Forman, C. Motta, S. Rothstein

Philadelphia: R. A. Ameisen, C. S. Bartek, W. F. Brong, J. L. Dearnley, F. E. Welch

Providence-Attleboro: R. E. Boucher

Portland: G. W. Bethell, R. R. Finzer

Rochester: J. F. Delelys, S. J. Guinta, R. E. Rickard, J. J. Vanderbeck

Rockford: R. H. Burnap, M. E. Rounds

Saginaw Valley: C. J. Auger, W. J. Brown, W. E. Ross, R. Sprague, Jr., M. E. Van Landeghem

St. Joseph Valley: D. P. Clemens, J. E. Russ, R. W. Zerbe

St. Louis: R. Mang

Seattle-Puget Sound: R. E. Martin

Southeastern: J. V. Giesler, Jr., F. J. Steven

Syracuse: H. W. Bushorr, J. A. Howard, D. H. Robinson

Toronto: G. Exelby, K. Graham, D. Knowlton, D. Lawson, T. Von Reirzenstein, V. Salovaara

Western Ontario: J. H. Marshall, R. F. Smith, J. H. Todd

Member-at-Large: C. W. Burke, Jr., Hialeah-Florida; T. O. D. Cruig, Surrey, England; R. M. Dick, Allen Park, Michigan; A. H. Szkudlapaki, E. Stroudsburg, Pa.; T. A. Todaro, Lakewood, New York

REINSTATEMENTS

Detroit: R. McManus
Grand Rapids: G. H. Walgren
Melbourne: F. Latta
New York: I. J. Feldman
Toronto: D. L. Larsen

TRANSFERS

Cincinnati: E. Huxley to Dayton

Dallas-Ft. Worth: T. E. Betz from Cleveland

Detroit: W. E. Stadel to Central Michigan

Grand Rapids: E. J. Banner to Central Michigan, F. Cook to Detroit, J. H. Garmager to Detroit, R. K. Martin to Central Michigan

Mississippi Valley: C. H. Bailey, Jr., from Rockford

Newark: C. B. Sanborn from Chicago

Pittsburgh: J. B. Mohler to Seattle-Puget Sound

Saginaw Valley: G. P. Beardsley to Milwaukee

Rockford: C. H. Bailey, Jr., to Mississippi Valley

RESIGNATIONS

Adelaide: R. J. Armstrong

Columbus: G. F. Cook

Dallas-Ft. Worth: J. A. Glazener, Jr., H. Peckham, E. W. Riddle

Dayton: W. Porter, H. A. Toulmin, Jr.

Detroit: G. W. Drysdale, G. L. Nankervis

Los Angeles: E. R. Calderon

Melbourne: I. M. Howman

Newark: H. Hebestreit, B. Leister, W. Ross

Philadelphia: Dr. W. A. LaLande, Jr., H. J. Perry

Rochester: J. J. Deamond, W. Stenzel

St. Louis: C. H. Pinkerton

Seattle-Puget Sound: T. Adams

Southeastern: W. D. Buice, E. P. Cofield, J. E. Hix

Toronto: W. H. Cresswell, W. R. Ellis

Western Ontario: K. W. Farquhar

SUSPENSIONS

Cleveland: R. Gaggino (in the armed forces)

Columbus: D. C. Grau, W. V. Hobbs, W. Reid

Grand Rapids: M. O. Bailey, R. W. Briskey, T. Lucas, W. Mooney, L. Przybylski

Hartford: W. Bezrudczyk, R. Choura, F. Garavelli, F. Sheltz, F. Tarza, H. Trella, E. Walter, I. M. Wolfson

Toronto: R. Asselin

DEATHS

Milwaukee: J. Mueller

New York: H. Miller

Dupraw Wins Recognition

Development of a method for analysis of tin in titanium alloys has brought special recognition to a scientist at Armour Research Foundation of Illinois Institute of Technology, Chicago.

William A. Dupraw, analytical research chemist, has been presented the ARF chemistry and chemical engineering department's award of scientific merit.

The award, established in 1953, is presented for "outstanding individual scientific accomplishment." The research cited must be original and either must be in use or capable of being placed in use without further modification or research.

Dupraw originally developed a method for analysis of tin in titanium alloys as part of co-operative work with the Metals Advisory Committee for Titanium of which he is a panel member.

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LUSTRALITE #10 is better than copper and equal to bright nickel plating for protecting steel and zinc die castings from corrosion.

LUSTRALITE #10 gives mirror-like finishes when plated directly with chromium.

LEVELING POWER OF LUSTRALITE #10

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Plate of uniform thickness can be deposited on parts with complex shapes.

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Plating salts and brighteners are stable. Methods of analysis simple and easy.

Control of bath is similar to the control of bright-copper plating baths.

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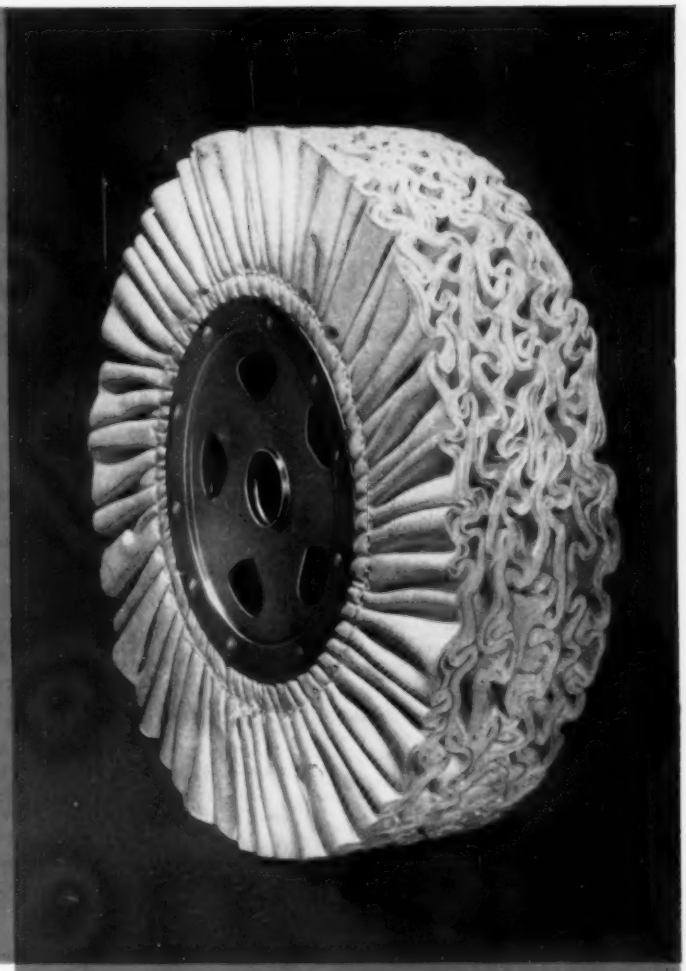

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BRANCH NEWS

BALTIMORE-WASHINGTON

LaQue draws Large Attendance at Joint Meeting on Corrosion

After partaking of a delicious steak dinner, which was served in the South Building of the National Bureau of Standards, the April joint meeting of the Electrochemical Society, the National Association of Corrosion Engineers and the AES was called to order in the East Building Auditorium by Program Chairman, **Ken Huston,** who explained the reasons for the joint meeting. The meeting was arranged to better acquaint the members of the three societies with each other and the activities of the other societies.

President **William Metzger** introduced **Dr. William Blum** who reported on the corrosion prevention research activities of the AES.

Fielding Ogburn introduced **Dr. M. C. Bloom** of the Naval Research Laboratory, Corrosion Section. Dr. Bloom traced the history of the Corrosion Division of The Electrochemical Society and reported on its present day activities, including publication of the Corrosion Handbook.

Ben J. Philibert introduced **George R. Best,** a director of NACE. Best reviewed the activities of The Technical Committees and the value of the corrosion abstracts published in "Corrosion."

Ken Huston introduced **F. L. LaQue,** vice-president, International Nickel Company.

LaQue delivered his talk on the subject "Planning and Interpretation of Corrosion Tests" in his characteristically forceful, yet entertaining manner. It concerned accelerated and long-time tests carried out to choose suitable corrosion resistant material for industrial applications. Special attention will be given to details that must be considered in designing and interpreting corrosion tests, to take into account such peculiar forms of corrosion as pitting, crevice corrosion, effects of heat treatment, effects of stress, galvanic action, effects of velocity and heating and cooling effects.

The talk was illustrated by many slides related to appropriate data and test methods.

CAPITOL DISTRICT

A Joint Meeting and New Officers Installed

The Capitol District branch held a joint meeting with the local branch of the National Association of Corrosion Engineers on March 26, 1956, at Panetta's Restaurant in Menands.

E. V. Raymond, the branch librarian, introduced the guest speaker, **Walter L. Pinner** of Houdaille Industries, Inc. Pinner gave a very interesting talk on the progress of Project No. 15.

Project No. 15, of which Pinner is chairman, is a joint-industry undertaking rather than the customary university-type project.

A brisk question and answer period followed Pinner's talk.

As an added attraction, **David X. Clarin** of Oakite Products, Inc. showed the group some excellent slides of his recent trip to Chile.

The highlight of the business session was the installation of the 1956 officers by **Chester Klimek.** The duly elected 1956 officers are: President, **John J. O'Connor;** 1st Vice-President, **Frank W. Hammond;** 2nd Vice-President, **Michael Guarneri;** Secretary, **Edward V. Raymond;** Treasurer, **Ferdinand Schweitzer;** Librarian, **W. Robert Wolf;** Board of Managers: Three Years, **Paul D. Callahan;** Two Years, **Frederick A. Infield;** One Year, **Herbert T. James;** One Year, **Raymond Dunlevy.**

Frank Hammond, chairman of the nominating committee, thanked the Board of Managers and the outgoing officers for assisting with the nominations.

The spring outing committee reported that the outing will be held June 16, at Endries on the Saratoga Road.

Raymond Dunlevy stated that the Pittsfield group will arrange a plant visitation and business meeting in the Pittsfield area either in October or November.

Charles Schenk, Jr.
Secretary

COLUMBUS

Dr. Lancy Speaks; Officers for '56 are Elected

The regular monthly meeting was held at Battelle Memorial Institute on April 6.

First Vice-President **John Soderberg** rapped the meeting to order and called upon Librarian **George Skelly,** who introduced the speaker of the evening, **Dr. Leslie E. Lancy.** Dr. Lancy's subject was "An Integrated Waste Disposal System for Plating Plants."

An interesting question and answer session followed.

First Vice-President Soderberg then called the business session to order.

Douglas Gordon, senior Columbus branch representative to the Tri-State Committee, reported on the Tri-State Regional Meeting and on progress in the Tri-State Committee. He stated that the 1957 Regional meeting will be held in Indianapolis, and asked for the comments of members on this and past regional meetings.

Acting Chairman of the Nominating Committee **John Beach** presented a slate of candidates for branch offices for 1956–57. There being no nominations from the floor, ballots were passed out and voting ensued. The results of the election were as follows: President, **Charles Shriver;** 1st Vice-President, **Calvin Smith;** 2nd Vice-President, **Rudolf Skriletz;** Secretary, **Halvor Christianson;** Treasurer, **Wilbur Hespenheide;** Librarian, **George Skelly.** Board of Managers: **Charles Faust, Nathan Koslin, John Soderberg.** Delegates: **Walter Denney, William Neill, William Safranek.** Alternates: **Richard Jaeger, Charles Shriver, Earl Shaner.**

Soderberg announced that the May meeting would be a dinner meeting, as in the past.

It was moved and carried that George Skelly take charge of arrangements for this meeting.

The meeting was then adjourned in favor of coffee and donuts by **Don Swickard.**

Michael Farr, Jr.
Secretary

CHICAGO

Gala Ladies' Night; Officers Installed; A Lot of Fun

The Chicago branch held its Annual Ladies' Night Meeting and installation of Officers on April 13. The meeting was held at Algauer's Fireside Restaurant. All of the superstitions about Friday 13 did not keep the majority of our members from attending, nor from having a good time. The fine dinner, beautiful door prizes and excellent program all added to make Ladies' Night Meeting a gala Event.

The first, and more serious portion of the evening was devoted to a report by **Paul Glab** on the activities of the past year. Officers for the coming year were then installed.

Attention was turned to the business of having a good time. The first item of this "business" was the drawing for the door prizes for the ladies. The winners were **Mrs. Colzel, Mrs. De Looth, Mrs. Hay** and **Mrs. Andrus.**

The final portion of the evening was devoted to a 3-D slide series entitled: "The Not So Wild and Wooly West." The series were prepared by **Al Dodds** and **Doug Hewes** of Western Electric.

Finally we have a number of members, old and new, to whom we would like to wish "good luck:"

To **Dick Connors** in his new assignment with Cowles . . . **Norm Garman,**

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1- **A thorough study of your requirements.**

2- **Design and installation of correct equipment.**

3- **Training of your employees in the easy, trouble free Du-Lite processes.**

4- **Production tested chemicals to insure constant uniformity.**

5- **Constant, *on the spot* assistance for all cleaning and finishing problems.**

DU-LITE DU-LITE
STEEL COLORING PROCESS
TRADE MARK

Specify Du-Lite products and equipment for:

CLEANING, BURNISHING OR BLACKENING—
Steel, Stainless, Cast Iron and Ferrous Alloys; Brass, Copper, Zinc.

RUST PREVENTIVE COMPOUNDS.

PHOSPHATE SPRAYING OR DIPPING—Steel, Iron and Zinc.

COLORING SILVER SOLDER.

REMOVING OXIDES AND OCCLUDED SALTS.

THE DU-LITE CHEMICAL CORPORATION · MIDDLETOWN, CONN.

BRANCH NEWS

who for many years represented Cowles in the Chicago Area . . . A different kind of Good Luck to **Berny Gagnon,** formerly of Chicago, now operating Gagnon Plating in Colorado Springs, Colorado. Berny had a fire and we hope he comes back full force. . . In the past **Rudy Hazucha,** has been listed as the outstanding bowler in the Chicago branch. **Roy Hoegh,** of Mercil Plating Equipment, is on a team which has won many honors and made television. Looks like Rudy had better watch his laurels. . . Chicago branch is really getting to be a female society. **Joan Wiarda,** of "Metal Finishing," will now be a member of the Chicago branch, transferring from the East. She, with **Eileen Drews** and **Irene Modjeska,** give us a trio of the fair sex as active members. . . **Bill Sticksel,** formerly with Udylite is now in the plating business in Aurora.

DALLAS-FT. WORTH

New Officers and Lowenheim

Attendance at the April meeting was encouraging, with 29 total and 9 of these visitors. Delegates for the convention

Lowenheim

were appointed.

Election of officers for the next year gave us the following: President, **K. W. Kirsten;** 1st Vice-President, **R. E. Rinehart;** 2nd Vice-President, **Roy Thomas;** Secretary and Treasurer, **A. C. Fricke;** Librarian, **R. H. Heppel;** Board of Managers: **R. H. Heppel, F. E. Lane, Paul Freed.**

The speaker was **F. A. Lowenheim** of Metal & Thermit Corp. His subject was "Tin and Tin Alloy Plating." This type of plating was of interest to the electronic and aircraft platers in our branch. The use of slides along with the talk made an interesting presentation. Lively interest was shown in the question and answer session following the speakers talk.

R. H. Heppel

DAYTON

Ricketson, Alfers and Weisner Speak

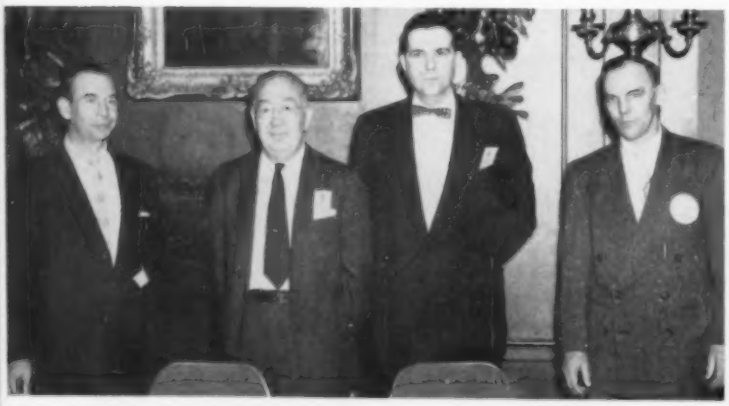
The regular April meeting was held at the Biltmore Hotel April 18th. Delegates and alternates elected were **Bob Ruleff,**

Weisner

Fred Bauch, L. A. Critchfield, Jack Baker, Bennie Cohen and **Walter Moline.** Chairman **Ralph Collins** also announced the nominating committee for the elections in May. They are **Frank Klein,** chairman, **Fred Bauch** and **John Easton.**

Richard Wolf, sales representative Hanson-Van Winkle-Munning Co. and **Billy Eley,** foreman, Nameplate & Monogram Co., Wapakoneta, Ohio were accepted into membership. **David Coffey** and **Mack Wise** of Westinghouse Electric of Columbus and **J. G. Schirtzinger** of Kelite Corp. were elected to membership in March. **Robert Nock** transferred to the Cincinnati branch.

The librarian introduced **H. C. Ricketson,** district manager and **R. E. Alfers** of Behr-Manning who presented a very good color film "Coated Abrasive Belts Speed Metal Working." The main speaker, **Dr. Harold Weisner** then presented a paper "Rhodium Plating for Use in Specialized Engineering Applications."



SEEN AT THE EMPIRE STATE REGIONAL

The speakers at the Empire State Regional in Buffalo were, l. to r.: Howard McAleer, Edward C. Bertucio, and Dr. Louis Weisberg with the education chairman, Frank Rudolph (Photo by Clarence Leary)

Mr. and Mrs. A. A. Janis at the head table during the banquet of the Empire State Regional meeting. Dr. Janis is President of the Buffalo Branch (Photo by Clarence Leary)

The Ladies' Committee. Their program featured a sparkling style show amid flowers and scintillating smiles. Standing, l. to r.: Mrs. J. Scholterer, Mrs. A. Janis, Mrs. C. Block, Mrs. B. Joffe, Mrs. R. Castle, Mrs. F. Geockel. Seated, l. to r.: Mrs. W. Hart, Mrs. Martin, Mrs. A. Nigro (Plating Staff Photo)

"Why accept imitations when the original costs no more!"

JOE-D Specialists in SISAL BUFFS!

Holders of the original patent on Bias Sisal Buffs — U. S. Pat. No. 2642706

It took specialized "know-how" to conceive and create the first patented Bias Sisal Buff! And that same knowledge has been steadily enlarged and improved by the ablest, most experienced staff in the business—concentrating on this type of buff. Today, our modern, efficient plant proudly produces buffs that meet the most exacting requirements of the metal finishing industry. Always insist on *original* quality. Specify JOE-D—America's *finest* Bias Sisal Buffs.

The JOE-D line covers a complete selection of Bias, Bias Spoke (Finger), and Conventional Buffs — as well as quality Polishing Wheels.

ATTENTION: JOBBERS! Some choice territories still available. WRITE TODAY!

the JOE-D Buff Company

SANDWICH, ILLINOIS • TELEPHONE 2171

BRANCH NEWS

Appreciation was shown by the rising vote of thanks given Dr. Weisner. Refreshments after the meeting were served to the 40 members and guests present by Hanson-Van Winkle-Munning and their local representative, **Gordon Lyons.**

R. M. Clinchens
Secretary

DETROIT

New Officers Installed by 3rd Vice-President Herbert Head

The April meeting of the Detroit branch was held in the Michigan Room of the Hotel Statler, April 6.

Opening the meeting was a colored film on the planting and care of gardens.

Lee Morse, now past president, formally opened the meeting by announcing that the annual Stag Day party would be held on July 28 at the Glen Oaks Country Club. **Bob Trees,** of the Udylite Corporation, is chairman.

The course in "Electroplating," which was held during the month of March, was very successful and plans are under way to hold a more comprehensive course next year.

Bert Lewis and **Herb Head** have prepared a history of the Detroit branch starting with the year 1917.

The Tellers Committee, headed by **John Hitchcock,** announced the results of the annual election: President, **H. J. McAleer;** 1st Vice-President, **R. J. Racine;** 2nd Vice-President, **G. Freidt, Jr.;** Secretary-Treasurer, **E. J. Kubis.** The new officers were installed by Herb Head, an old hand at this occupation. Howard McAleer accepted the reins of authority from Lee Morse and very graciously thanked the members for the honor.

Douglas Thomas then informed the members that the May meeting will be Sustaining Members Night of which **C. D. Sparling** will be technical chairman.

Dr. Gerald Kingsley, technical chairman of the evening introduced the guest speaker, **Charles Kimmel** of the Magnesium Department of Dow Chemical Company. Kimmel's topic "How to Finish Magnesium" described chemical treatments, galvanic corrosion and some new developments in the field.

The meeting, attended by 180 members, was adjourned for refreshments at 9:30 P.M.

Patrick J. Driscoll

HARTFORD

New Officers Installed by Past President Logozzo

The regular branch meeting was held at the Bon Hotel on April 16 and 52 members and guests were present.

The guest speaker for the evening was **Dr. Foster Dee Snell** of Foster D. Snell Inc., whose subject was "Detergency and Surface Activity."

Anrold Johnson was the technical chairman for the evening. After a brief introduction by **Arthur Logozzo,** the following members were installed for the coming year: President, **George Colombie;** 1st Vice-President, **Stuart Begg;** 2nd Vice-President, **Walter Acker;** Secretary, **Stanley Platoz;** Treasurer, **Bernard Cohen;** Educational Advisor, **Armand Faucher.** Educational Committee: **Arnold Johnson** chairman, **George Meriano,** and **Richard Mullaney.** Board of Managers: **Joseph McInerney, Julia Madzik, Ralph Chase** and **Ralph McCahan.**

Stanley Platoz
Secretary

INDIANAPOLIS

A Paper is Made Ready for the Convention

The April 4 meeting proved that branch member participation can bring out attendance. The program for this meeting was given by the committee who is in charge of the "Paper" for the 1956 convention. This was titled "Filter Media." Forty-five members and guests attended this meeting at the Fox Steak House. After the usual opening of business with President **Herb Kennedy** presiding, the

You can depend on

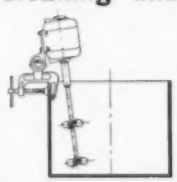
SEELEY
Buffing Compounds

For that added touch which makes for an Outstanding Product

Bar — Liquid — Greaseless

E. E. SEELEY COMPANY INC.
Bridgeport 1, Conn.

This Portable MIXER Will Speed-up YOUR Cleaning and Degreasing Operations



Mount Alsop Mixers to any tank or container —for any fluid mixing operations in your plant.

Here's a speedier, low-cost way to clean and degrease your work parts. An Alsop Mixer will do all the work —it will drive and dash the solvent through and around the parts—cleans them faster, and far more efficiently.
Sturdy, dependable Mixers for any size or shape, new or existing Tanks, for single or multiple installations. Alsop Portable Mixers are easily and quickly mounted. Sizes 1/4 to 7-1/2 H.P.

Write Today For ALSOP Mixer Catalogue

ALSOP ENGINEERING CORPORATION
1106 Fine St., Milldale, Connecticut

Aluminum
anodizing, buffing and cleaning

No matter what your aluminum finishing problem or need, you'll find the answer at H-VW-M... because it is the one company combining a complete engineering service with a complete line of equipment and supplies!

ELECTRICAL EQUIPMENT — Want the best possible recommendation of a Rectifier . . . Generator . . . or Control Equipment for your particular operations? Page 2 tells how to get it.

STILL TANK OR FULL AUTOMATIC EQUIPMENT — Whatever your need — from a single component to a complete, integrated system — H-VW-M supplies it . . . Page 3.

ENGINEERING SERVICE AND INSTALLATION — H-VW-M engineers and technicians are anodizing equipment specialists, with years of experience. Page 3 tells why these H-VW-M services mean greater efficiency and savings in your plant.

ALUMINUM FINISHING SUPPLIES — Page 4 shows how H-VW-M research has resulted in new compounds, improved buffs and cleaners to make aluminum finishing easier, better.

HANSON-VAN WINKLE-MUNNING CO. · MATAWAN, NEW JERSEY, U.S.A.

HANSON-VAN WINKLE-MUNNING COMPANY

MATAWAN, NEW JERSEY

Manufacturers of a complete line of electroplating and polishing processes, equipment and supplies

Plants: Matawan, New Jersey • Grand Rapids, Michigan

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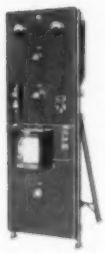
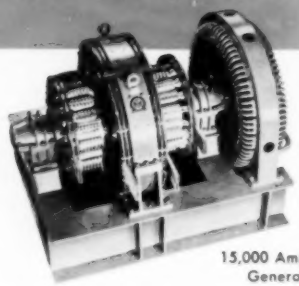
These H-VW-M Anodizing and Finishing to New Savings, New Efficiency, New

ELECTRICAL EQUIPMENT

H-VW-M is the only manufacturer of both Germanium and Selenium Rectifiers *and* low voltage, direct current Motor Generator Sets for the metal finishing industry. This thorough experience in every phase of low voltage power generation and rectification means that when you bring your power problems to H-VW-M you're sure to get the perfect equipment recommendation.



Automatic Anodizing Control Panel



15,000 Ampere, 6-Volt Generator Unit

Generators . . . and Controls

H-VW-M Motor Generators designed especially for metal finishing operations are built in sizes up to 50,000 amperes, and accessory equipment includes a full line of controls and control panels to cover any desired control function. Easy-to-maintain H-VW-M Motor Generators have exceptionally rugged and practical construction features insuring maximum performance and life. Standard voltage ratings range from 6 to 50 volts, and include the 18 and 24 volt units usually required for sulphuric acid anodizing, plus the 40 and 50 volt units used in chromic acid anodizing. Write today for 24-page Bulletin G-103, covering in detail all H-VW-M Generators.

Germanium and Selenium Rectifiers . . . Rectifier Controls

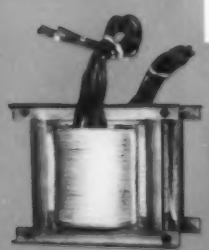
Self-Contained Rectifier with Tap Switch Control

Remote Controlled Rectifier with Tap Switch Control

Highest quality and efficiency, flexibility, economy and low maintenance are the characteristics combined in H-VW-M's full line of both Germanium and Selenium Rectifiers. 6 to 48 volt units—both remote and self-contained—provide the exacting low-voltage, high-current rectification required in aluminum anodizing. The widest possible choice of controls and control combinations is available. Such devices as manual or motor operated tap switch controls, continuously variable auto-transformers and saturable core reactors are used with or without supplemental controls to provide automatic voltage stabilization, automatic current stabilization as well as automatic programming.

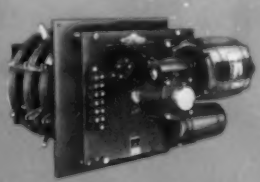
Write for Bulletin ER-108, which gives further information about Rectifiers and Controls, plus useful control application suggestions.

Manual Tap Switch Control



Saturable Core Reactor

Continuously Variable Auto-Transformer



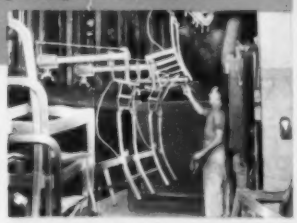
Motor Operated Tap Switch Control

Supplies, Equipment and Services Add Up Simplicity of Operation in Your Plant

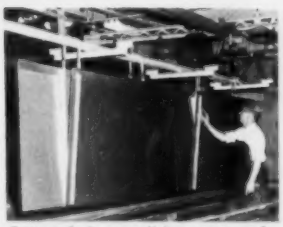
PROCESSING EQUIPMENT

Whatever your anodizing procedure, there's an H-VW-M Full Automatic Conveyor that can be adapted to any production application requiring automatic cycling of individual treatments—or an H-VW-M Tank with accessory equipment that is perfectly adapted to still tank methods of any kind.

Workman "dials" desired cycle in refrigerator plant. Parts will by-pass or lower into baths as dial setting dictates.



With H-VW-M automatic anodizing system, 1 man in furniture company does work of 12.



Featured in anodizing system for massive building panels are special 30-ft. tanks. Entire system H-VW-M designed, installed.

Full Automatic Conveyors

H-VW-M was the pioneer in the development of full automatic conveyors for use in electroplating and other electrolytic processes. Over the years H-VW-M's close association with production problems in plating rooms across the nation has resulted in scores of innovations and improvements which have contributed substantially to the steady advance of metal finishing techniques.

Full automatic conveyors as used in anodizing operations have been an important concern at H-VW-M for years. One special development of particular interest in aluminum anodizing is H-VW-M's unique selective by-pass mechanism. With this device a whole rainbow of colors can be anodized in one continuous operation, and in any sequence. Length of treatment time can be varied for each individual conveyor arm, consistent with the overall cycle. These features bring a new kind of versatility to anodizing operations. Different products requiring different anodizing cycles may be processed at the same time, using the same equipment. In terms of efficiency, labor savings and increased production, this unusual device is truly revolutionary.

It is just one among many types of conveyors and equipment offered to aluminum finishers. Return-type conveyors . . . elevator conveyors . . . high-lift conveyors . . . straight-line conveyors . . . and others, all are designed, manufactured and installed by H-VW-M. Write for Bulletin FA-105, which fully describes all types.

Tanks and Equipment

At H-VW-M—the plating and anodizing industry's workshop—you'll find tank equipment for every phase of your work. For chromic acid anodizing, H-VW-M double electric welded unlined steel tanks are offered, along with steel coil equipment for cooling and heating. The entire system is H-VW-M designed, supplied and installed. For sulphuric acid anodizing, lead-lined steel tanks, plus the necessary cooling coils and air agitation assembly, are supplied. Tanks are fabricated from hot rolled steel, stainless steel, and aluminum. Other types of tanks are also available. Bulletin No. T-108 gives full particulars about this important H-VW-M equipment. Every conceivable type of auxiliary equipment is engineered and supplied, according to customers specifications, including a complete packaged refrigeration system for anodizing solutions.

And H-VW-M's Engineering and Installation Service

Anodizing problems of *any* kind? H-VW-M is prepared to set up your entire anodizing system from beginning to end—a system made up of components scientifically engineered to work together with utmost efficiency. Because of this, and because of H-VW-M's continuing research and development in every aspect of the anodizing picture, you can be confident that the recommendation you receive from H-VW-M is the very *best*.

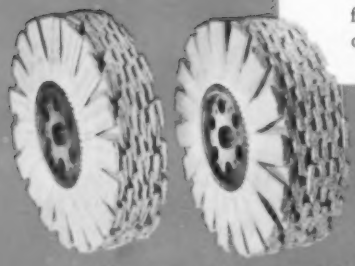
What's more, if requested, H-VW-M sees to it that the equipment you buy is H-VW-M *installed*. This means perfect, efficient operation from the start.

Add to this the fact that an H-VW-M technical representative—ready to serve you—is no further than your telephone. These representatives serve in principal cities across the nation. Get to know the one nearest you. He can help you get the most from your aluminum finishing equipment and supplies.

TURN THE PAGE FOR ALUMINUM BUFFING AND CLEANING SUPPLIES

ALUMINUM BUFFING AND CLEANING SUPPLIES

Since aluminum came into its own after World War II, considerable H-VW-M research and development work has been devoted to the perfection of buffs and compounds suiting the unique physical characteristics of this popular light metal. When long-wearing H-VW-M Buffs are used in conjunction with H-VW-M compounds especially formulated for aluminum finishing, you have the perfectly balanced combination for economy, efficiency and quality performance.



Buffs

Nowhere will you find a wider selection of the buffs you need for preanodizing operations than at H-VW-M. Whether you're looking for a super-heavy-duty buff like new steel-centered Ruff-L-Buffs (which are available untreated, or Binderized® for extra long wear) medium duty buffs like Triplex Buffs, or a buff for medium-to-light service such as the Full Disc Buff, you need look no further than H-VW-M. The full H-VW-M line also includes new Tufta-Flex Buffs (cloth tufts) and Sisal-Flex Buffs (with sisal-centered tufts), plus specialty buffs of every variety.

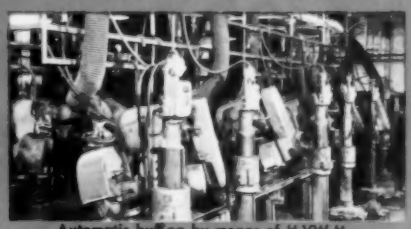
Among this array you'll find the exact buffs for your aluminum finishing needs. Every one is characterized by first quality, uniform new material of close weave and good weight . . . tight sewing with heavy thread . . . and proper balance. Write for 12 page Bulletin B-103, which describes H-VW-M's entire buff line.

Compounds

For heavy duty cutting, H-VW-M Liquid Tripoli Compounds 303 and 420 were developed, and are now widely used in the cooking utensil industry. For the appliance, storm window, construction materials and automotive fields, H-VW-M's new Liquimatic Liquid Compound No. 728 has proved especially successful, giving excellent cut, while leaving the surface with deep, high color.

H-VW-M Bar Compounds also find broad use in aluminum finishing. A variety of tripoli bar compounds are offered in varying consistencies to meet all cutting requirements. For cut and color, special white compounds are available. And for high color, several new H-VW-M aluminum oxide compounds—No.'s 6B 168, 6B 72 and 8390—give unusually good results. Write for Bulletin CO-103.

Hand buffing using H-VW-M buffs, compounds.



Automatic buffing by means of H-VW-M Liquimatic System.

Cleaners

H-VW-M devotes constant research to the subject of cleaners in its search for ever better products in the aluminum finishing field.

Matawan Cleaners are designed specifically to give superior results in soak cleaning, power spray operations, oxide removal, and for special aluminum cleaning and etching operations. Of particular interest is H-VW-M's 85S Cleaner, which prevents scale formation, thus keeping coil and tank walls scale free. This unusual aluminum cleaner leaves an extremely bright surface, and, because of its built-in regenerator, makes maximum effective use of caustic in the bath.

In line with its desire to supply the exact cleaner for the job, H-VW-M offers its extensive laboratory facilities where circumstances demand a special cleaner.

When you think of aluminum finishing equipment and supplies—think of H-VW-M first. Buying from one dependable source . . . H-VW-M . . . means one company assumes full responsibility—your guarantee that you're getting the best . . . in products . . . in performance, in *extra* service.

PLATEMANSHIP

Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.

HANSON-VAN WINKLE-MUNNING COMPANY, MATAWAN, N. J.

Plants: Matawan, N. J. • Grand Rapids, Mich.

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H-VW-M

INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES

3113

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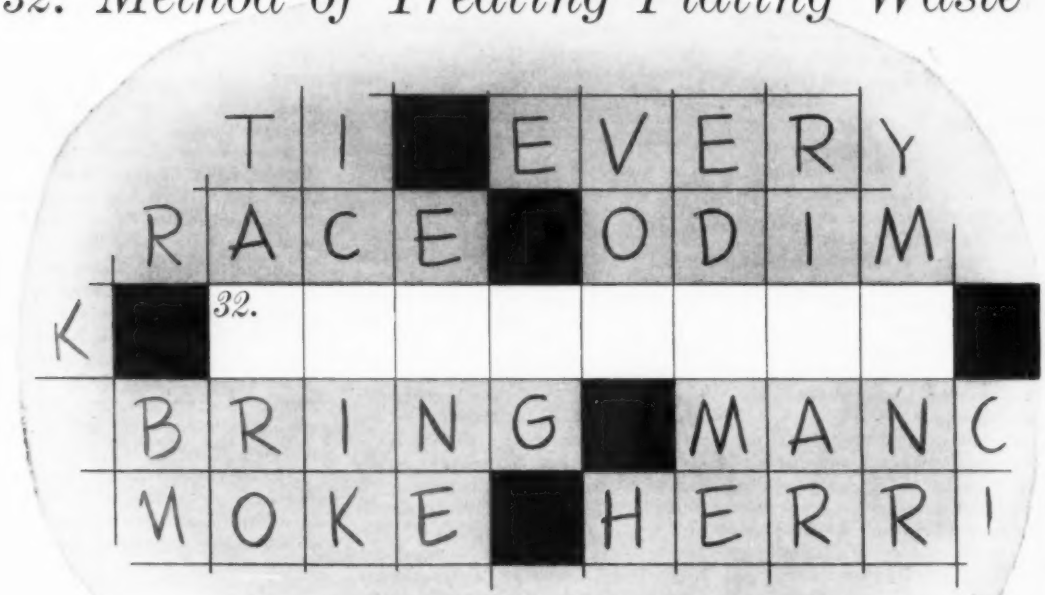
32. Method of Treating Plating Waste



RECOVERY? DISPOSAL?

There is no one process that will solve all plating waste problems. Experience has shown staff and consulting engineers that the correct solution can be obtained only by thoroughly evaluating all the factors in each case.

Whether the answer is recovery, disposal or a combination of both, Graver has complete equipment to do the job. Graver's 50 years of liquid treatment experience has resulted in equipment of advanced designs and engineered flexibility to suit individual requirements.

WRITE FOR TECHNICAL ARTICLE AND BULLETINS:
T-136: Plating Waste Solutions; Recovery or Disposal
WC-103A: Reactivators • WC-111: Ion Exchangers

GRAVER®

Industrial Waste Treatment Dept: W-211
GRAVER WATER CONDITIONING CO.
Division of Graver Tank & Mfg. Co., Inc.
216 West 14th Street, New York 11, N. Y.

BRANCH NEWS

following old business was reported. At the recent Tri-State meeting, nineteen of Indianapolis branch members attended. **Fred Anderson** is senior member on the committee for the Indianapolis Tri-State meeting for next year—1957. A motion was made by Anderson that a branch representative be elected at the coming election to serve on the Tri-State Committee. This was seconded and passed. **Bruck** reported that progress is being maintained in the writing of the branch history. **Bert Hawbee,** general chairman for the annual dinner-dance and educational session reported everything is about ready. The following reported also: **Roman Bender** on contributions, **Hartwig** on tickets, Anderson on education session, Bruck on evening entertainment, and **Edna Rohrabaugh** on favors.

Al Kreise brought up the question as to where the charter of the Indianapolis branch is. Since not too much light could be given on this, in a motion by Kreise (seconded by Bender) it was decided that the secretary order a duplicate charter and pass it on to the next secretary.

Concerning a branch exhibit at the national convention, discussion lead to the fact that time is too short to do much this year. Bruck moved that the Indianapolis branch not participate in an exhibit this year. This was seconded by **Tom Evans** and passed.

The following new members were elected to the branch in a motion by Bruck, seconded by **Abraham Max: Marvin Steuernagel,** Indianapolis; **Fred Wm. Adams,** Anderson, Ind.; **Fred L. Maker,** Union City, Ind.

Max reported on the idea of a class in electroplating.

The place for the 1957 Tri-State meeting which will be in charge of this branch caused much discussion. The suggestion to have it at French Lick Springs Hotel at French Lick, Indiana or at the Claypool Hotel in Indianapolis seemed to be the two most likely places.

"Filter Media" a very timely and interesting paper in charge of a committee who have worked diligently for several months was given as the program of the evening. **Marshal Whitehurst,** chairman of this committee, aptly presented it with the help of **Elmer Lundberg,** who read parts of it. It is to be given at Washington, D. C., in June by the members. After it was completed, the branch applauded and showed its appreciation of the long hours of preparation. Much discussion followed. Whitehurst thanked the many who helped in this preparation and especially the committee.

Edna Rohrabaugh
Secretary

KANSAS CITY

The monthly meeting of April 12 was held at the Berkshire Hotel, with thirty-one members and six guests in attendance.

The meeting was called to order by Vice-President **Glenn Wilson.** It was announced that the stag party would be held at the Aladdin Hotel, June 22. Attendance is restricted to 150.

The next order of business was the election of officers for the coming year. The officers elected to serve for 1956 are: **Glenn Wilson,** President; **Warren Eliot,** 1st Vice-President; **Frank Sweitz,** 2nd Vice-President; **Olin Bock,** Secretary; **George Becker,** Treasurer; **Bill Deterdering,** Librarian; and **Bill Nutt,** Sergeant-at-Arms.

The speaker for the evening, **Richard Brown,** representative of United Chromium Corporation, was introduced and presented a very interesting discussion accompanied by picture slides covering "Plating with Crack-Free Chrome."

Olin Bock
Secretary

LOOK FOR THE
MARK OF QUALITY

PRODUCTS BY
UB
UNITED BUFF

Specify:
THE *Pressure-Cooled* BUFF
MADE WITH THE
ONLY EXTRA-DUTY
BUFFING CLOTH

Designed and Manufactured Only by:
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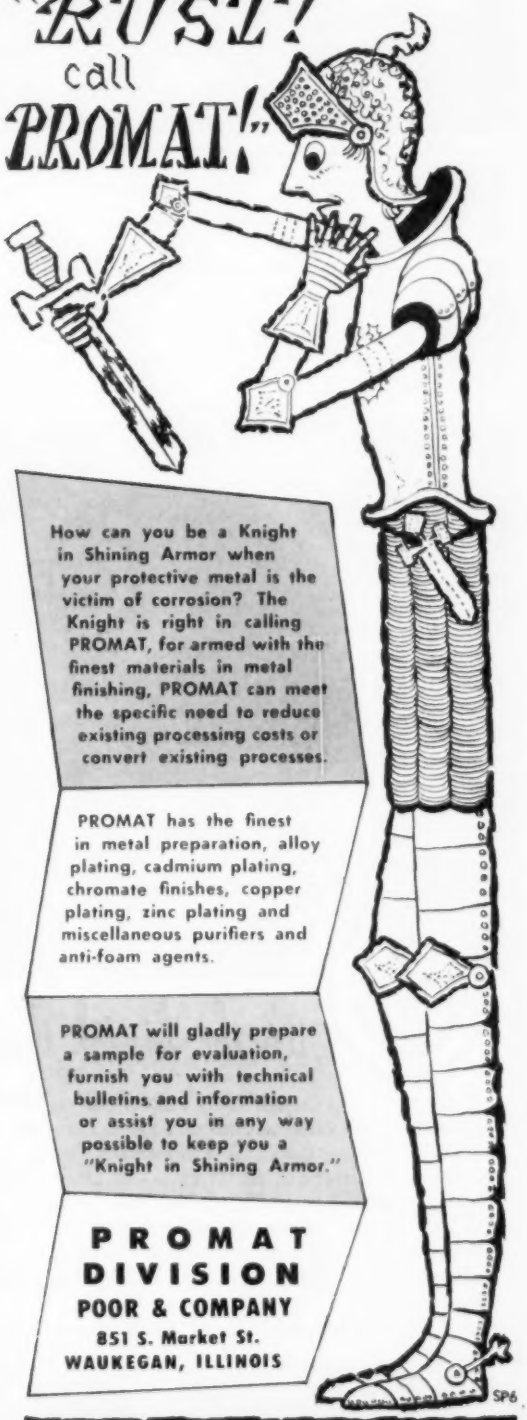

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New Officers of the Los Angeles Branch: l. to r.—E. W. Arnold, Past President; G. Maurean, 1st Vice-President; N. McEwan, 2nd Vice-President; T. Stoner, President; E. Coffin, 1960 Convention Chairman; E. Babcock, Librarian; F. Virgil, Secretary, and G. Hetz, Treasurer

LOS ANGELES

New Officers for a Lively Branch

The regular monthly meeting of the Los Angeles branch was held at Rodger Young Auditorium on April 11, with 96 members and guests in attendance.

The meeting was called to order by President **Earl W. Arnold,** followed by introduction of visitors by the sergeant-at-arms and the reading of the minutes of the last meeting by the secretary. A financial report covering the results of the March 26 Annual Technical Session and Dinner-Dance was presented by the treasurer.

1st Vice-President **Truman Stoner** presented the membership report, pointing out the substantial increase in membership during the 1955-56 period compared to the 1954-55 period, amounting to a gross increase of 26 new members. He then introduced 10 new potential members, all of whose qualifications were to be examined by the Board of Managers and reported on for the May meeting.

The following new members were installed by President Arnold: **Jack W. Schultz, Glenn T. Sink, Phillip L. Greathead, Marion L. Maroney.**

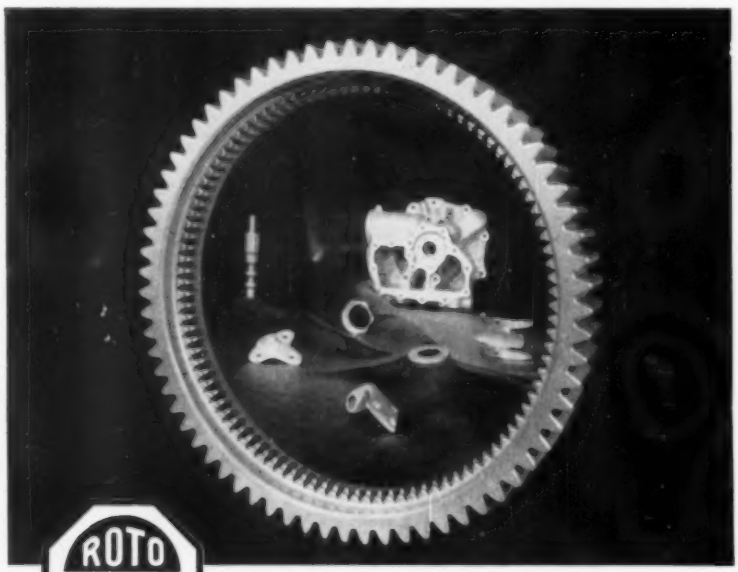
Under unfinished business, **Earl Coffin,** chairman of the National Convention Committee for 1960, presided and stressed the important functions of our delegates for the National Convention in June, pointing out the vigorous campaign they must perform for bringing the convention to Los Angeles in 1960. Certain tactics and procedures were outlined, and approved by the membership, and a meeting was scheduled for April 17, for elaboration of the committee's plans. The president made a plea to vote on a maximum $600 over the normal delegate expenses to be used primarily for promotional work. Arnold pointed out that this money would be reimbursed should we win the 1960 campaign, and that should we lose it, the money would be forfeited. A nomination was presented from the floor to allow this money to our delegates, and was seconded and passed unanimously.

Under new business, Truman Stoner, membership chairman, announced the winners of the membership contest for 1955–56 period. **Frank Virgil** won 1st Prize, a $50 Gift Certificate; **Everett Elgin** won 2nd Prize—a $25 Gift Certificate. **Don Bedwell** reported the illness of **Loeb Hinderer** of Price-Pfister Brass Mfg. Co., who recently had suffered a heart attack and is currently convalescing at Glendale Sanitarium. Flowers with a get-well card were sent to him.

The president turned the meeting over to Earl Coffin, who officiated as master of ceremonies for installation of new officers. Coffin introduced each officer and handed the gavel to the new incoming president, Truman Stoner. Stoner announced his appointment of **Larry M. Henderson** as the new sergeant-at-arms and **Kenneth Johnson** as the research committee chairman. **Stuart Krental** presented a gift past-president pin to Earl Arnold.

The meeting was turned over to the librarian, **Norm McEwan,** who introduced **Henry Walker** of Permaluster, Division of Allied Marketing and Research Co. Walker talked on "Anodic Films on Aluminum—Their Origin and Background, and Their Current Applications."

Frank Virgil
Secretary



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BRANCH NEWS

LOUISVILLE

Reifsteck Heads New Officers

The regular monthly meeting was held on March 15 at Kapfhammers Party House. First Vice-President **Ken C. Reifsteck** opened the meeting at 8:00 P.M. with 24 members and guests present.

James R. Smith, delegate to the Tri-State Regional Meeting, submitted a fine report of the Banquet and Educational Session which was held at the Biltmore Hotel on March 10 in Dayton, Ohio. Over 800 people attended this fine meeting.

Ed Bruck of the Indianapolis branch gave a report on the Regional meeting to be held in Indianapolis next year.

The newly elected officers of the Louisville branch for the 1956-1957 fiscal year are as follows:

President, **K. G. Reifsteck;** 1st Vice-President, **S. J. Beyer;** 2nd Vice-President, **R. G. Marshall;** Secretary-Treasurer, **J. G. Sterling;** Librarian, **J. S. Houston;** Sergeant-at-Arms, **D. T. Scott;** Board of Managers: **A. A. Oertel, P. H. Pate, J. W. School.**

Delegates and alternates elected to the 43rd Convention to be held in Washington, D. C. are as follows: Delegates: **J. G. Sterling, S. J. Beyer, H. Peters;** Alternates: **J. S. Houston, J. R. Smith, R. G. Marshall.**

The meeting was turned over to the Technical Sessions Chairman, J. S. Houston, who introduced the speaker **Charles E. Kimmel** of Dow Chemical Co. The subject was "Electroplating on Magnesium," which was accompanied by slides and narration.

J. G. Sterling
Secretary-Treasurer

MELBOURNE

Two Excellent Meetings With Two Fine Speakers

President **H. Littauer,** chaired the 102nd regular meeting on March 15 at which 55 members and friends were present. The minutes of the 100th and 101st meetings were read, confirmed and seconded. Two new members were admitted and one member resigned

A list of books in the library, which is now mobile, has been prepared and are available for loan.

G. Walker introduced **L. J. Forbes,** manager of Nilsen's Industries (Aust.) Pty. Ltd., who spoke on "Some Aspects of Industrial Management."

A vote of thanks to the speaker was moved by **K. Howard** and carried with acclamation.

On April 19 President H. Littauer chaired the meeting at which 49 members and friends were present.

The N.S.W. Metal Trades Employees Assn. was advised that the Poisons Act is enforced in Victoria, and the Electroplating Industry adheres to it strictly. Seven new members, one re-instatement and one resignation were received.

J. J. Dale introduced **Professor Worner** of the Melbourne University who spoke on "Metals of the Future." The lectures were illustrated by excellent slides and the keen discussion which followed was limited only by time available.

MISSISSIPPI VALLEY

Lux Sheds Light on Cleaning

The April meeting of the Mississippi Valley branch was held in the Tower Restaurant in Moline, Ill. on April 18.

Lux

The meeting was called to order by 2nd Vice-President **Bernard Nordblom.** Nordblom introduced **Jerry Lux,** Technical director of Oakite Co., who was the speaker of the evening.

Lux opened his talk on "Alkaline

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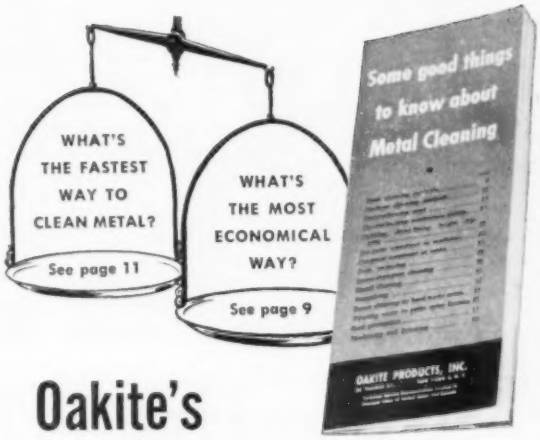
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See page 11
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BRANCH NEWS

Cleaning" with the statement that if you are interested in plating, you must be interested in cleaning. He defined dirt as matter out of place.

Nordblom then showed a color film entitled "Die Castings—How Else Would You Make Them?" It showed the method of manufacturing and plating die castings in a very interesting way, and was enjoyed by all.

NEW HAVEN
New Officers and a Talk
by John Swift

A regular meeting was held on April 10 at the Mason Laboratory, Yale University.

President **William K. Murray** opened the meeting with the roll call of officers. Approximately 40 members and guests were present.

The New England Regional Committee reported a very successful affair in Hartford on April 7. From every standpoint this was the biggest and best Regional Meeting of all.

The following new applications for membership were read and accepted: **George Lindquist, John F. Cook, Calvin D. Iezzi** and **Michael A. Iessi.** These new members are welcomed into active membership.

The following members were unanimously elected to the designated offices of the branch for the fiscal year April 1, 1956, to April 1, 1957: **Austin P. Jackson,** President; **Leo Roberti,** Vice-President; **Bernard J. Gaffney,** Secretary-Treasurer; **Charles A. Kuster,** Librarian; **Frederick E. Allen,** Assistant Librarian;

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George F. O'Connor, Sergeant at Arms; **Harry R. Taylor,** Historian; Board of Managers: **William K. Murray, Edward F. Busby, John M. Barry.** Delegates to Convention: **Harry R. Taylor, William K. Murray, Dr. Henry L. Kellner.** Alternate Delegates to Convention: **Edward F. Busby, Bernard J. Gaffney, Charles A. Kuster.**

Newly elected President, Austin P. Jackson, then accepted the gavel from retiring President, William K. Murray, who was complimented upon the fine job he did both in the branch and as head of the New England Regional Meeting.

The May meeting will feature a talk by **Rich** on the subject of Ultrasonic Cleaning and an International Nickel film on corrosion.

The meeting was then turned over to Technical Chairman, **Walter T. Lynch** who introduced the speaker of the evening, **John A. Swift,** president, Swift Industrial Chemical Co. of Canton, Conn. He presented an interesting talk on "What the Plater Should Know About Metallurgy."

The door prize was donated by John Swift, of the Swift Chemical Co.

Bernard J. Gaffney,
Secretary

NEWARK

Two Meetings; New Officers

The March 16 meeting of the Newark branch was a goodly turnout for Ladies' Night in spite of the biggest snowfall of the year.

Nine applications for membership were accepted and four were elected into the branch—**Raymond Sileneck,** National Electric; **Joseph Vouglas,** Federated Metals Division; **Irving Bernstein,** Chemclean Products; and **Gerald Van Tilburg,** The American Metal Co., Ltd.

Robert Ehrhardt, Chairman of the Nominating Committee, placed in nomination the following officers who were duly elected: President, **Clifford Struyk;** 1st Vice-President, **William Grigat;** 2nd Vice-President, **Gustave Bittrich;** Secretary, **D. Gardner Foulke;** Treasurer, **George Wagner;** Librarian, **Dodd S. Carr;** Sergeant-at-Arms, **Fred Meyer;** Board of Managers: **Thomas Austin, John Gumm, Robert Horrocks, George Reuter.** Delegates: **D. Gardner Foulke, William Grigat, George Wagner.** Alternate Delegates: **Gustave Bittrich, Louis Donroe, John Gumm.**

National 1st Vice-President, **Dr. Samuel Heiman** installed the officers and after greeting the ladies, gave a brief report on Society affairs, including the showing of colored slides of the office and personnel. After appointing William Grigat Chairman of the 1956 Christmas Party Committee, President Struyk turned the meeting over to Librarian Bittrich, who took charge of the bingo game.

Winners of prizes donated by G. Wagner of Hy-Grade, **D. Clarin** and **J. Banta** of Oakite, G. Bittrich of Bell Labs, D. Carr of Bart Labs, D. Foulke of H-VW-M, C. Struyk of General Chem. and F. Meyer of MGM Records were: Mesdames **Bittrich, La Manna, Abazia,** Miss **Meyer** and Messrs. **Grigat, Kovatis** and **Bernstein** with Mrs. **Carr** winning the grand prize—a clock radio supplied by the branch.

The meeting concluded with a movie

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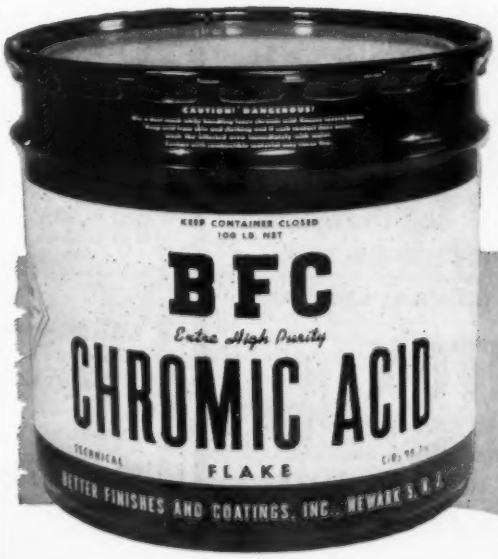

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shown by **Howard Cobb,** and refreshments.

At the April 20 meeting of the Newark branch, three resignations were accepted, and nine members elected—six from Independence Plating Co. of Paterson. Five applications were received. George Wagner reported a satisfactory profit from the Christmas Party and that all branch bills were paid. Don Foulke moved that **Sam Glickenhaus,** George Reuter and **Sam Taylor**—because of long and faithful service to the branch be elected Honorary Members. The motion passed. President Struyk presented a Past President's pin to Tom Austin.

Librarian Carr then introduced **Dr. Henry Linford** who discussed experimental work carried out at Columbia University on the study of the effect of solution flowing past a cathode vs a wire moving through a solution.

The main speech of the evening was given by **James Badaluco** of the J. C. Miller Div. of H-VW-M. By means of colored slides, some of which were excellent photomicrographs, he gave the story of tripoli in our industry to the 76 members present.

D. Gardner Foulke
Secretary

NEW YORK

New Officers and Heady Wine

Ladies' Night was held April 13, 1956 at the Hotel Statler.

The meeting was called to order by the retiring President **Albert Fusco.** Since it had been scheduled that at this meeting the newly-elected officers were to be installed, Fusco called on **Franklyn J. MacStoker** to preside for this function. Before the installation, however, Mac Stoker made the following presentations on behalf of the members of the New York Branch: To Albert Fusco—A "Past-President" Pin and also a traveling bag; To **George Schore**—A movie camera—"Bell & Howell;" To **Irving Goldwasser**—A pen and pencil set—"Parker 51."

These gifts by the branch are a symbol of appreciation by the members for the unselfish and untiring efforts in previous years of Fusco, Schore and Goldwasser.

Next MacStoker introduced the new officers as follows: President, **Derick Hartshorn;** 1st Vice-President, **Geo. Herrmann;** 2nd Vice-President, **Dr. Edward Saubestre;** Librarian, **Joseph Rembecki;** Financial Secretary, **Ralph Liguori;** Recording Secretary, **Anthony P. Briganti;** Sergeant-at-Arms, **Jack Weiner.**

Albert Fusco now joins MacStoker and Angelo Amatore on the Board of Managers.

Derick Hartshorn took over the chair and without ado introduced **McDonald,** a representative of the "Wine Institute of America." A brief talk by our speaker was followed by the showing of a film entitled "Growing Wine in America." When the film was concluded the floor was opened for questions. Some of the questions put to the speaker by the members included: fermentation, alcoholic content, standards, aging, etc. The speaker shattered the old belief that the older the bottle of wine the more savory the wine. He insisted that bottled wine (with the exception of "Champagne") allowed to stand for too long a period of time could become flat. This must have been a signal for it wasn't long after this last statement that the group retired to the refreshment table to sample some of the wines which we had just been enlightened on. This met with the delight of all present who enjoyed the wines and other refreshments which were served at this very eventful evening. The 110 members and guests present tendered the speaker a rising vote of gratitude.

Anthony P. Briganti
Recording Secretary

PHILADELPHIA

Trusdell Heads Officers for 1956–'57

The regular meeting on March 26, preceded by a dinner, was opened at 8:15

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ESTOX 110 WASHING MACHINE CLEANER—a superior cleaner for all industrial washing machines.

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ESTOX 130 PAINT DEFLOCCULATOR—to keep headers and nozzles in paint booths open for maximum atomization. Water soluble.

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BRANCH NEWS

by President **Trusdell** with 49 present. Two active members were admitted and three applications were received. Year-end reports were presented by Vice-Presidents **Cogan, Farren** and **Trusdell.**

There being no opposition to the slate of candidates for the 1956–57 term presented by the nominating committee, the following were declared elected by ballot cast by the acting secretary: President, **William H. Trusdell;** 1st Vice-President, **Robert L. Farren, Jr.;** 2nd Vice-President, **James E. Cogan, Jr.;** Secretary, **I. Wm. Marcovitch;** Treasurer, **Paul Mentzer, Sr.;** Librarian, **C. Brooks Ricca;** Board of Managers (one vacancy): **William H. Moyer;** Delegates: **Samuel Heiman, William H. Trusdell, I. Wm. Marcovitch;** Alternates: **Paul Mentzer, Sr., Robert L. Farren, Jr., James E. Cogan, Jr.** The new officers were installed by Past President **Nat Verrelle.**

The speaker was **Dr. Dodd S. Carr,** Bart Manufacturing Corp., who spoke on "Nickel Electroforming." With the aid of slides, he showed the various shapes and forms made by this process. He also showed a color-sound movie on electroplating, "A Brighter Tomorrow."

I. Wm. Marcovitch
Secretary

PITTSBURGH

Myron Ceresa is New President

The March meeting of the Pittsburgh branch was highlighted by the election of officers for next year. They are: President, **Myron Ceresa;** 1st Vice-President, **Herb Schram;** 2nd Vice-President, **Jim Crain;** Secretary, **Fred Stevens;** Treasurer, **Bill Pizoli;** and Librarian, **Russ Reynolds.** To the Board of Managers **Rudy Schindler** and **Rex Goldbach.** Elected to represent Pittsburgh as Delegates were **Rudy Schlindler, Bob Woofter** and **Ed Smith** and as Alternate Delegates **Myron Ceresa, Rex Goldbach** and **Leo Schmitt, Sr.**

Other business which took place was the introduction to the members of three new applicants to the Society, **W. Scott McCormick, A. J. Chinnici** and **C. R. Harr.** The business session was concluded with a report by **Ken Hittle** that plans were all set for the Ladies' Night Banquet April 21.

The evening which had started with dinner at the Avalon Room of the Sherwyn Hotel was concluded with an excellent talk by **R. E. Hafer** of Reynolds Metal Company, who discussed "Chromic Acid and Sulfuric Acid Anodizing Processes."

The meeting was concluded with the drawing for the door prize and question session after a short refreshment break. **Joe Bugel** won the prize presented by **L. M. Ring** of Ring Supply Co., a Ladies' Sunbeam Electric razor.

A Fine Ladies' Night

The annual Ladies' Night Banquet was held April 21 in place of the regular branch meeting. Co-chairman Myron Ceresa and Ken Hittle did an excellent job in arranging this year's affair. Selection of the new Gateway Plaza Restaurant in Pittsburgh's new Golden Triangle Point development was an excellent choice of location. An unusually large number turned out for the cocktail hour preceding dinner, where the best of spirits and friendship was enjoyed.

At dinner, a fine filet mignon meal was served. This was followed by the entertainment furnished by Bill Heinz and Buzz Aston of KDKA-TV fame and accompanied by Joe Negri. Then the drawing for the door prize and presentation of favors to the female guests took place.

Leo Schmitt then called forth this year's branch president, **Rudy Schindler,** and presented him with the past-president's pin. Also, he introduced next year's branch president, Myron Ceresa.

The activities for the remainder of the evening were dancing to Baron Elliott's orchestra and refreshments at the bar. All in all it was another very successful affair.

Herb Schram
Secretary

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BRANCH NEWS

PORTLAND

Dinner in a Restored House with Ancient Armor

Our regular March meeting was held at the Kamm Restaurant House on March 20, and was well attended. Two new members were voted into the branch—**R. R. Finzer** and **George Bethell.**

After dinner, the speaker, **George Davis** of E. I. du Pont, San Francisco, gave a very interesting and informative talk on vapor degreasing in general, and as applied to the particular problems of the plating industry. Davis is du Pont's technical representative on chlorinated solvents in this area.

Dale Tweed
Secretary-Treasurer

PROVIDENCE-ATTLEBORO

Doyle on Buffing Compounds; Delegates Named

The branch held the regular monthly meeting on April 16 at the Providence Engineering Society Building in Providence.

President **P. Lonsbury** called the meeting to order at 8:15 P.M. **J. Noonan** was appointed chairman of the nominating committee to be assisted by **Arthur Woods** and **John Broadbent, Jr.**

The Annual Spring Party will be under the direction of **J. Henry.**

Delegates for the coming convention in Washington will be: **Dr. E. Parker, L. Ferguson, P. Lonsbury.** The alternates are: **G. Gibbs, P. Clarner** and **F. Sherman.**

President Lonsbury introduced **J. Doyle,** Lea Mfg. Co., Waterbury, Conn., who spoke on "Buffing Compounds." A rising vote of thanks was given Doyle for his informative talk.

Meeting adjourned at 9:00 P.M.

ROCHESTER

Lisowski Explains Automation

The Rochester branch met for their monthly meeting at the 40 & 8 Club on March 19.

Dr. Janis, president of the Buffalo branch, gave an announcement regarding the Empire State Regional meeting to be held in Buffalo on April 14. He left tickets with our president, **Ed Wallin,** for the affair.

Jack Martin of Buffalo was also present at this meeting.

The meeting featured colored movies, 3-D slides and a speech presented by **Frank Lisowski,** Wagner Brothers, Detroit, who had selected as his subject, "Automation—Purpose and Requirement."

Delegates Announced; Hendrixson on Vapor Degreasing

The April 16 meeting was held at the 40 & 8 Club. The meeting was called to order by 2nd Vice-President **F. Thiem.**

A short business meeting was held and delegates and alternates to the forthcoming convention in Washington were announced as follows: Delegates: **F. Beuckman, L. Morrison, E. Wallin.** Alternates: **C. Fideor, W. Smith, J. Hourihan.**

The business meeting was adjourned and Librarian Frank Beuckman introduced **P. P. Hendrixson,** service manager, Chlorine Products Div., Electro-Chemical Dept., E. I. Du Pont de Nemours Co., Inc., Delaware. Hendrixson presented a very informative and interesting talk on "Vapor Degreasing in Application and Process Control." His speech was supplemented by color slides. After a short business period, refreshments were served.

F. L. Johnson
Secretary

ROCKFORD

Safety is Subject of Wesson and Dever

At the regular March meeting of the Rockford branch, held in the Faust Hotel, twenty-seven were present for dinner and about forty attended the business meeting and safety presentation which followed.

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BRANCH NEWS

Delegates to the National Convention were named with **William Geissman** heading the list.

President **Foley** announced that **Walker Eaton, Walter Fox** and **Stuart Golding** would serve on the nominating committee to report at the May meeting at which time election would also be held. The committee in charge of the annual party reported everything was in readiness and that all members should do their share toward having a large turnout.

Lawrence Ray introduced **Wesson** and **Dever** of the mine Safety Appliance Company, who presented two very timely films and gave a very interesting talk on safety.

E. J. Budden
Secretary

SAGINAW VALLEY BRANCH

A New President; A Plant Tour

The April 11 meeting of the branch was opened at 8:30 P.M., at the Michigan House, Bay City, Mich. by President **Robert Nyquist** with 86 members present.

President Nyquist then introduced the new president **Robert J. Brink** to the members and turned the meeting over to him.

The new president presented retiring president Robert Nyquist with a gavel on behalf of the members of the Saginaw Valley branch.

The following applications were voted on and accepted: **Chas. Auger,** Birmingham, Mich.; **Reid Sprague,** Livonia, Mich.; **Wallace Brown,** Saginaw, Mich.; **Moran Van Landeghem,** Mich.; **Wm. Ross Jr.,** Royal Oak, Mich.

The meeting was turned over to Librarian **Vern Gutscher,** for the drawing of the door prize. The door prize was donated by **Stan Sax** of the American Buff Co. The prize was won by **Al Peters.**

The meeting was adjourned at 9:15 P.M. and members traveled by private conveyance to the Chevrolet Plant, Bay City Division, GMC where they were conducted on a tour of the plant to observe the plating, buffing, and die casting operations.

D. T. Rewbotham
Secretary-Treasurer

SOUTHEASTERN

By-Laws to be Amended; Allen Burmon Talks

Our regular monthly meeting was held on Friday evening, April 13 at the Belmont Steak House, Atlanta, Ga. The meeting was called to order at 7:30 P.M., **Clyde Stovall** presiding, 25 members and guests present including a most distinguished guest—**Archie Mac Dermid.** Delegates were appointed as follows: **H. R. Stogner Sr., George W. Taylor, Robert H. Probert;** and alternates **Louis Rosenberg, W. T. Weymouth,** and **Bob M. Taylor.** It was moved that we begin planning for the second educational session, but it was decided to postpone such business until the May meeting when the new officers normally assume office in May; the educational session should be put into progress in April; was moved to amend the Branch By-Laws to install the officers in April, rather than in May. The vote thereon is to be taken in approximately 30 days by mail. New members were elected as follows: **Jean V. Giesler, Jr.,** Knoxville, Tennessee, and **Frank J. Steven,** Jackson, Mississippi. The Branch News, our new branch publication was given official recognition and authority to continue.

Our speaker for the evening was **Allen R. Burmon,** vice-president of Cro-plate Company, Inc., of Hartford, Connecticut, who presented a most interesting talk on "Pressure-Blast, A New Metal Finishing Tool." After the usual question and answer session we adjourned at 10:00 P.M.

George Taylor is President; Branch Grows

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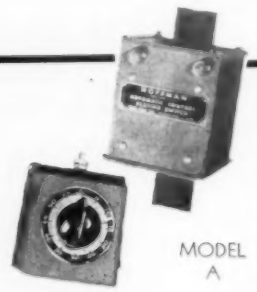

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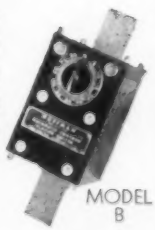

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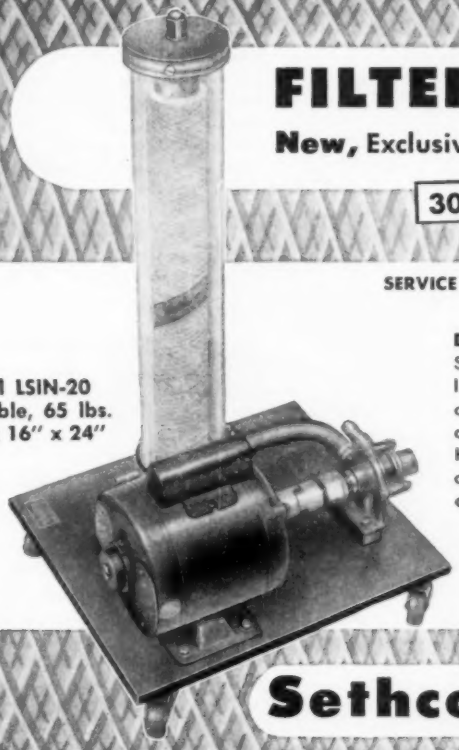

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BRANCH NEWS

on Friday evening, March 9, at the Belmont Steak House, Atlanta, Ga. The meeting was called to order at 8:30 P.M., 26 members and guest present, **Clyde Stovall** presiding. The minutes of the January meeting were read and approved as read. Clyde Stovall was appointed chairman of the committee to compile the branch history. The financial report of the Technical Session Committee was read to the attending membership. Applications for membership were voted and accepted for the following: **Sam D. Anderson,** Pan American Airways, Miami, Fla.; **James B. Dasher,** Pan American Airways, Miami, Fla.; **Ernest Owen,** National Airlines, Miami, Fla.; **Russell V. Sanburg,** Simmons Plating Works, Atlanta, Ga. It was noted that **M. H. Dent** of Pan American Airways in Miami, a long time member in good standing, was most instrumental in signing the new members from Pan American Airways.

New branch officers were elected as follows: President, **George Taylor;** 1st Vice-President, **Charles Lewis;** 2nd Vice-President, **Claude Nally;** Librarian, **H. R. Stogner, Sr.;** Secretary and Treasurer, **Robert H. Probert.** Our speaker for the evening was **T. A. Turner,** vice-president of Crown Chemical and Engineering Company, who spoke on "Germanium and Selenium Rectifiers."

Robert H. Probert
Secretary-Treasurer

SOUTHERN TIER

A Plant Tour; Dr. Meyer Gives a Talk

We were all immensely proud of the success of our April meeting. This was the largest meeting of our young branch history, with approximately 90 attending. We feel this was due largely to the cooperation of International Business Machines, Corp. and **Dr. Walter Meyer,** who together produced a most dynamic afternoon and evening. We began with a most educational and instructive plant tour, conducted for the branch by IBM. This tour covered their plating, heat treating and waste disposal systems and left many of us with new ideas for the future. We then returned to the Vestal American Legion Hall where a delicious turkey dinner was served. The meeting was opened by President **L. Rood,** who thanked everyone connected with the plant tour of IBM. He turned the meeting over to **A. Fletcher** who introduced the guests present: **Edward Wallin,** President Rochester branch; **Milton Stevenson,** Secretary Syracuse branch; **Burt Daw,** LaSalco Corp.; **Norman House,** LaSalco Corp.

Fletcher then introduced Dr. Walter Meyer, president and technical director of Enthone, Inc., who spoke on "Seeing Plating Solutions in Action." Dr. Meyer was assisted by **Hubert M. Goldman,** technical service manager of Enthone, Inc. Dr. Meyer's experience and knowledge of plating and its many problems resulted in a wonderfully interesting and extremely informative discussion.

Roger Wheeler
Secretary

Tatoian Speaks on Polarography

The regular monthly meeting of the Southern Tier branch opened at 8:10 P.M. with President **Rood** introducing our visitors. **H. Harper** reported IBM gave permission for a plant tour. Three new members were signed into our branch.

Tatoian

A letter from Society Headquarters was read regarding branch exhibits at the National Convention. A discussion followed, and it was decided that an exhibit with sequences of operations was not feasible. Exhibit of finished parts only could be considered. A motion was made and seconded. Nomination of **G. Zurenda** for branch historian was made by **A. Fletcher** and motion was carried.

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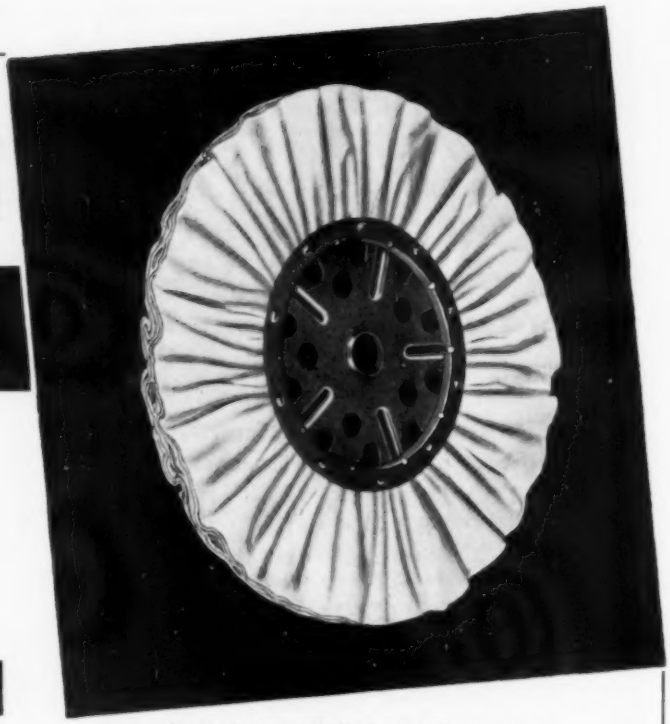

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PLATING, because of the tremendous reception it received with its feature issue on "Water Purification and Waste Treatment," is again devoting its August issue to a further study of the same subject.

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BRANCH NEWS

Opel of Buffalo branch spoke on Regional Meeting at Buffalo, April 14. He advised reservations be made as soon as possible. A program for ladies was announced. Speakers for the educational meetings will be announced in a letter which will follow.

S. Stefanski introduced **G. Tatoian** of Patwin Instruments Division of the Patent Button Co. Tatoian's topic was "Polarography in the Analysis of Plating Solutions." His very interesting and informative talk was followed by question and answer period.

ROGER W. WHEELER
Secretary

ST. JOSEPH VALLEY

Third Vice-President Head Installs Officers on Ladies' Night

Seventy-one members and guests attended the Ladies' Night gathering held at the Lincoln Highway Inn, April 4.

The evening was devoted to entertainment, and the business session was kept to a minimum. Three new members were elected: **Ralph Zerbe, Daniel Clemens** and **Joseph Russ.**

Our branch was fortunate to have as guests for the evening, Mr. and Mrs. **Herberth Head.** During the business session Herb discussed the pros and cons of branch exhibits at national conventions. He also did the honors in installing the new officers for 1956–57.

The chairman of the Ladies' Night Program, **Art Wiegand,** provided a magician and ventriloquist who put on a very clever half-hour program.

Each of the ladies was presented with a bottle of hand lotion as a favor. In addition, there were three door prizes which were given away by a drawing of names. The Standard Plating Co. crowd won two of the three prizes (The Weavers and the Curtisses).

The evening was a huge success and the committee deserves a special vote of thanks.

Dr. A. Lloyd Taylor Gives a Lesson on Cleaning

Fifty-five members and guests were present at the March 7 meeting. **George Shuman, A. P. Strickler** and **John Devendorf** were elected as members. The following applications were read and accepted: **Joseph E. Russ, Daniel P. Clemens, Ralph Zerbe.**

The nominating committee's slate for the officers of 1956–57 were presented and elected. They were:

Delegates nominated: **R. D. Wysong, James Hedges, Eugene Roth;** Alternates: **R. Brouwer, H. J. Weisner, John Lockerbie.**

Ray Dearth then introduced **Dr. A. Lloyd Taylor,** Director of Research, McDermid Western Inc. His subject was "Metal Cleaning—Particularly Zinc Die Castings and Brass."

After the talk numerous questions were answered by the speaker.

Harold J. Wiesner
Secretary-Treasurer

ST. LOUIS

A Tour and a Talk at Dow Chemical

The regular monthly meeting was held April 11 at The Dow Chemical Company's plant in Madison, Ill. Sixty members and guests were present for a roast beef dinner in the company cafeteria. After dinner **Lyle Treat,** chief control chemist, discussed the fundamentals of plating on magnesium. After Treat's informative talk the group was divided into groups of eight, each group being furnished a guide to conduct them on a tour of the largest magnesium fabricating plant in the world. The tour covered rolling, extruding and casting.

The business meeting was postponed until the next month due to the fact that the groups did not return at the same time and it would have been difficult to get the group together.

A Lively Meeting with Two Speakers

The March dinner meeting of the St. Louis branch was held at the York Hotel with 23 members and guests present for dinner. We were happy to have as our guest **Robert Michaud** of the W. D. MacDermid Chemical Company who is a member of the Hartford branch. We were pleased to see **L. A. Davies** had recovered sufficiently from a recent illness to be present at our meeting.

The business session was called to order with 30 members and guests present. One new member was accepted: **William H. Piel** of Commercial Plating Company.

Louis Berra reported for the Banquet committee.

President **Hunleth** appointed the following nominating committee: **Louis Berra,** Chairman; **Eugene Conroy, John Vogt.**

At this point the meeting was turned over to the Librarian, **Dick Nyquist,** who before introducing the speaker of the evening, reported that the next meeting would consist of tour of the Dow Chemical Company's Magnesium Plant in Madison, Ill. The tour must start at 7:30 with a dinner and a short talk by **Lyle Treet** of Dow Chemical Company preceding the tour. Then Dick Nyquist introduced **King Ruhly,** sales manager, Michigan Chrome and Chemical Co., who gave an interesting talk on plastic linings for tanks with special emphasis on vinyl plastisols.

Ward W. Kelly
Secretary-Treasurer

SPRINGFIELD

A Talk on Mg Finishing

The Springfield branch met for the April meeting, at Blake's Restaurant. After dinner, the balance of the evening was given over to the technical session. The guest speaker for the evening was **Dr. John A. Stevens** of Dow Chemical Company, Midland, Mich. who is a finishing specialist in the Magnesium Department. His subject for the evening was "Magnesium Finishing." There were accompanying comparative slides. A question period followed. Springfield had as a well-known guest, **Ralph McCahan** of Dupont, from the Hartford branch.

Art Logozzo Shows Two Films

The Springfield branch met at Blake's Restaurant on Monday evening for the regular monthly meeting and to hold annual elections. The results of the election areas follows: President, **Roger R. Heroux;** 1st Vice-President, **Charles F. Griffin, Jr.;** 2nd Vice-President, **Edward J. Mahar;** Secretary, **Henry L. Heissfeld;** Treasurer, **George H. Mangeau;** Librarian, **Antonio B. Horta.** The Board of Managers are: Past President **Robert Girard, Raymond Howe, Ralph Mongeau, John E. Costigan,** and **Wm. Grover.**

Our speaker for the evening was **Art Logozzo,** president of the Nutmeg Chrome, of West Hartford, Conn., who first showed a color film on "Hard Chrome Plating," and then opened a question box and general question period. Art also brought along a short bonus film which was entitled "Acres of Generators at Weirton Steel." As was to be expected a general informative good time was had by all.

HENRY L. HEISSFELD
Secretary

SEATTLE

Three Meetings Reported Culminating in New Offices

The January 17 meeting of the Seattle-Puget Sound branch was held at the Stewart Hotel. The meeting was called to order by Vice-President **Bob Carlson.** Since no formal business meeting was held in December due to the Society's visit to the Boeing Airplane Company, the minutes for the November meeting were read and approved. A discussion was held regarding the appointment of a Nominating Committee, and it was decided that the President **George Millard** should select and appoint a committee before the next meeting date.

The meeting was turned over to **Roy Smith** of the Boeing Airplane Company, who discussed aircraft and military metal finishing specifications.

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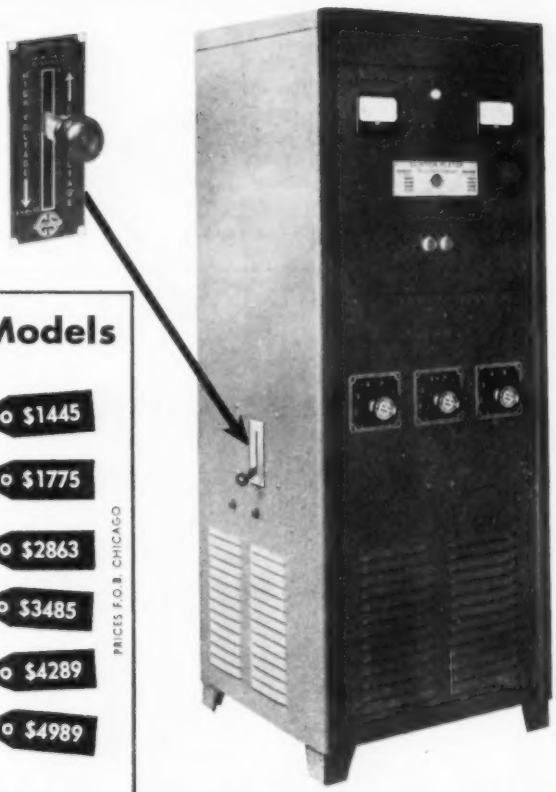

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BRANCH NEWS

After a short question-and-answer period, the meeting was adjourned at 9:45 P.M.

The monthly meeting was held on February 21 at Andy's Diner. We were favored with the largest turnout in our young history with a total of fifty-five members and guests in attendance at the meeting.

A report was made by the Nominating Committee and members were suggested for the branch's consideration.

The speaker of the evening, **Lyle Nielson** of the Washington State Pollution Control Commission, was introduced and presented a very informative outline of the goals, problems, and progress of the Pollution Control Commission in our state.

The meeting was adjourned at 9:30 P.M.

The March 27 meeting was held at Andy's Diner. The reading and approval of the minutes of the February meeting was followed by the introduction of guests. One resignation, that of **Tom Adams,** was reported; and a new member, **Raymond E. Martin,** was welcomed.

A guest, **Carl Hausle,** president of Platers and Polishers Local No. 14, was invited to speak and gave an interesting summary of the scope and attractions of the coming Industrial Labor Exhibition to be held in Seattle April 20–25. Special reference was made to the displays which will represent the metal finishing industry.

The annual election was held, and the following officers were elected and installed: President, **Robert I. Carlson;** Vice-President, **Nat Gilbert;** Secretary, **William P. Foley;** treasurer, **Rodney A. Becker.** Due to a misunderstanding regarding the election and tenure of members of the board of managers, the election of these officers was held over until a letter clarifying the situation can be sent to the members prior to our next meeting.

After the business meeting the speaker of the evening, **George W. Davis,** a representative of the Solvents Division of the DuPont Company, gave a very interesting talk on vapor degreasing.

After a short question-and-answer period, the meeting was adjourned at 10:30 P.M.

William P. Foley
Secretary

WATERBURY

A Plant Visit after New Officers

Election of officers for the year 1956–1957 was held at our March meeting. The following officers were elected: President, **Theodore Voyda;** 1st Vice-President, **Spencer Henn;** 2nd Vice-President, **Edward T. Garland;** Secretary-Treasurer, **Albert J. Griffith;** Librarian, **Frank Tirendi;** Assistant Librarian, **Isidore Cross;** Publicity Director, **Nicholas Topazio.** Board of managers: **Joseph V. Petrocelli, Perry J. Sloane, Francis T. Eddy.** Convention delegates: **Theodore Voyda, Ellsworth T. Candee, Francis T. Eddy.** Alternates: **William V. Coleman, Joseph V. Petrocelli, William P. Innes.**

Our April 12 meeting was held at the Elton Hotel. The dinner was held as usual but the business and technical meetings were postponed so that the group could visit the plant of the Naugatuck Chemical Co., Division of U. S. Rubber Co.

The group left the Elton at 7:15 P.M. and drove to Naugatuck by car. We were greeted at the plant by **Stanley England** of the Industrial Relations Dept. About 30 members participated and were split up into two groups.

Naugatuck Chemical Co. consists of three separate plants—Synthetic Plant, Chemical Plant and the Re-Claiming Plant. We visited only the Re-Claiming Plant.

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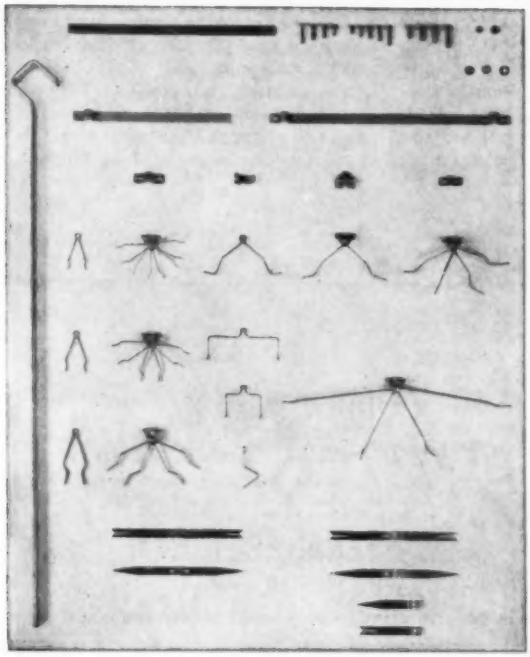

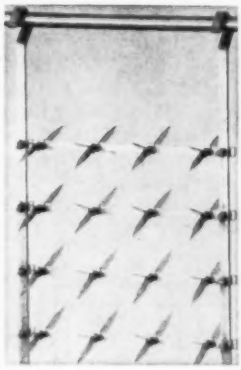

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BRANCH NEWS

After the trip, we were taken to the Conference Room where we met **Nicolai Timmens,** plant engineer. He spoke to us about the plant in regard to power of consumption and their water supply. A question and answer period followed

This was the first plant visit our branch has held and we enjoyed it very much. We shall look forward to more in the future.

WESTERN ONTARIO

New Officers and a Talk by Wesley Smith

Election of officers of the Western Ontario branch took place at the regular dinner meeting held April 20 in the Wm. Pitt Hotel, Chatham, Ontario.

Elected were: President, **Alex. V. Corbit;** Vice-President, **Earl Patterson; Dave Mainland,** Branch Secretary; **Dick Kirk,** librarian. **Norm Southern,** a past president was good enough to get busy with the branch history. The annual Toronto branch meeting in Niagara Falls was discussed, and as usual a number of our members intend to take this in. Delegates and alternates were duly appointed to the Annual Convention in Washington.

The speaker for the evening was **Wesley Smith** from the De Vilbiss Co. of Toledo, Ohio. His topic was "Use of Spray Equipment in Polishing and Buffing." Smith was equal to the discussion period that followed when he answered some very good questions submitted from the floor.

Alex. V. Corbit
Vice-President

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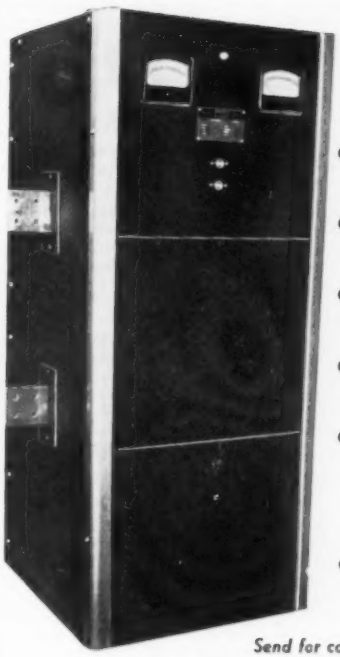

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WANTED—Recent graduate in electroplating for development of finishes for aluminum and all plated coatings for other metals. An opportunity for a man interested in the application of plating processes with a leading manufacturer of household appliances. Write, giving personal details and salary expected. Reply to Box J1, PLATING, 445 Broad St., Newark 2, N. J.

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SITUATION WANTED—Technical sales or plating foreman. Age 38, 2 years college (Chem. Eng.). Experience: managed job shop; set up and worked production shop; 8 years sales experience in plating supplies, equipment, cleaners. Worked as platers representative. Now living New Jersey area. Immediately available. Reply to Box J5, PLATING, 445 Broad St., Newark 2, N. J.

CHEMIST, 37, 11 years' inorganic industrial experience includes batteries, general physical and chemical commercial testing, and electroplating (Cu, Sn, Cd, Ni, Cr). Reply to Box J6, PLATING, 445 Broad St., Newark 2, N. J.

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June 4 Big Day for Saxes

Benjamin P. Sax, Pres., American Buff Co., and his wife, Goldie, celebrate their fortieth wedding anniversary on June 4. *On the same day* his parents, David and Gertrude, of Benton Harbor, Michigan, celebrate their 65th wedding anniversary. *Also on June 4*, Leonard B. Sax, Sec.-Treas. of American Buff Co., and son of Benjamin P. and Goldie, celebrates his 39th birthday. . . . What a day will have been June 4th in the Sax family.

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AES

June 17-21—**43rd Annual Convention of the AES, Hotel Statler, Washington, D. C.**

June 18—Branch Secretaries' Meeting, California Room, Hotel Statler, Washington, D. C.

June 18—AES Editorial Board Meeting, Massachusetts Room, Hotel Statler, Washington, D. C.

June 19—Branch Librarians' Meeting, California Room, Hotel Statler, Washington, D. C.

June 19—AES Research Committee Meeting, Massachusetts Room, Hotel Statler, Washington, D. C.

June 20—AES Public Relations Task Committee Meeting, Massachusetts Room, Hotel Statler, Washington, D. C.

June 17-20, 1957—44th Annual Convention of the AES, Sheridan-Mt. Royal Hotel, Montreal, Canada.

May 19-22, 1958—45th Annual Convention of the AES, Sheraton-Gibson Hotel, Cincinnati, Ohio.

INTERSOCIETY

June 3-8—SAE Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

June 5-8—Material Handling Institute Exposition, Cleveland Auditorium, Cleveland, Ohio.

June 6-8—American Society for Quality Control, 10th Annual Convention and Exposition, Palais Du Commerce, Montreal, Canada.

June 11-15—7th National Plastics Exposition, Society of the Plastics Industry, Inc., New Coliseum, New York.

June 14-16—ASME Applied Mechanics Conference, University of Illinois, Urbana, Illinois.

June 17-21—ASME Semi-annual Meeting, Cleveland, Ohio.

June 17-22—ASTM 59th Annual Meeting and 12th Apparatus Exhibit, Chalfonte-Haddon Hall, Atlantic City, N. J.

June 25-29—American Institute of Electrical Engineers, Summer and Pacific General Meeting, San Francisco, California.

June 26—Society of the Plastics Industry, Plastic Structures Division Conference, New York.

August 6-8—Society of Automotive Engineers, West Coast Meeting, San Francisco, California.

September 10-12—ASME Fall Meeting, Denver, Colorado.

September 16-22—ASTM Electroplating Practices Symposium, West Coast Meeting, Hotel Statler, Los Angeles, California.

September 16-22—2nd ASTM Pacific Area National Meeting, Hotel Statler, Los Angeles, California.

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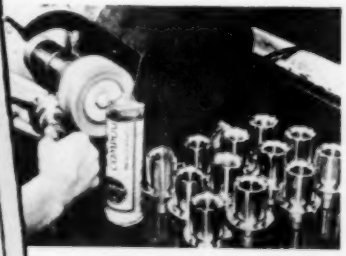

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